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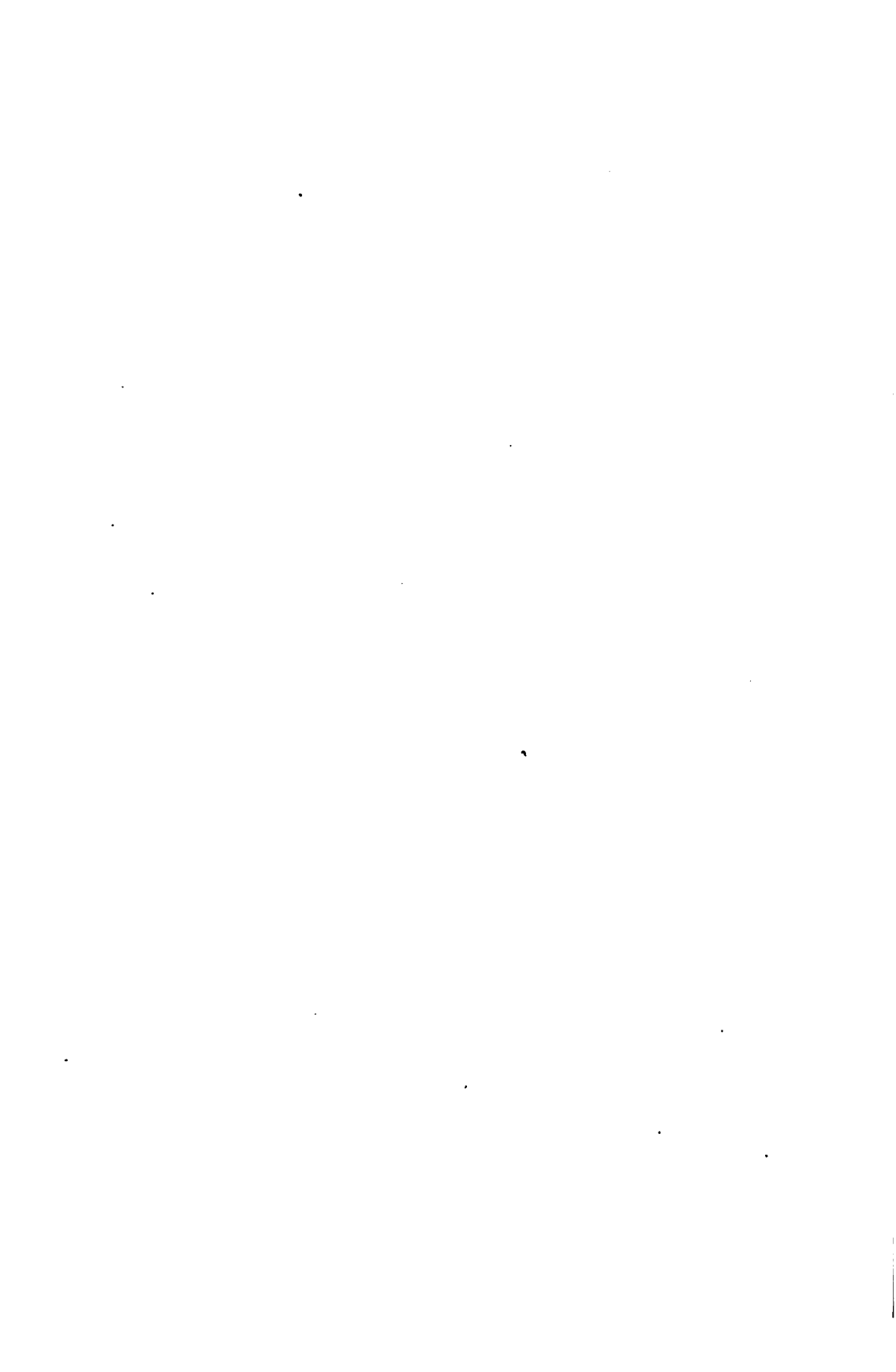
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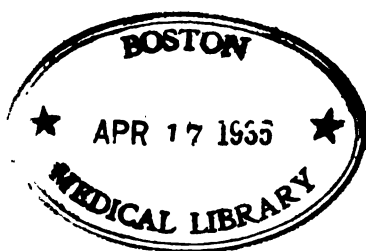
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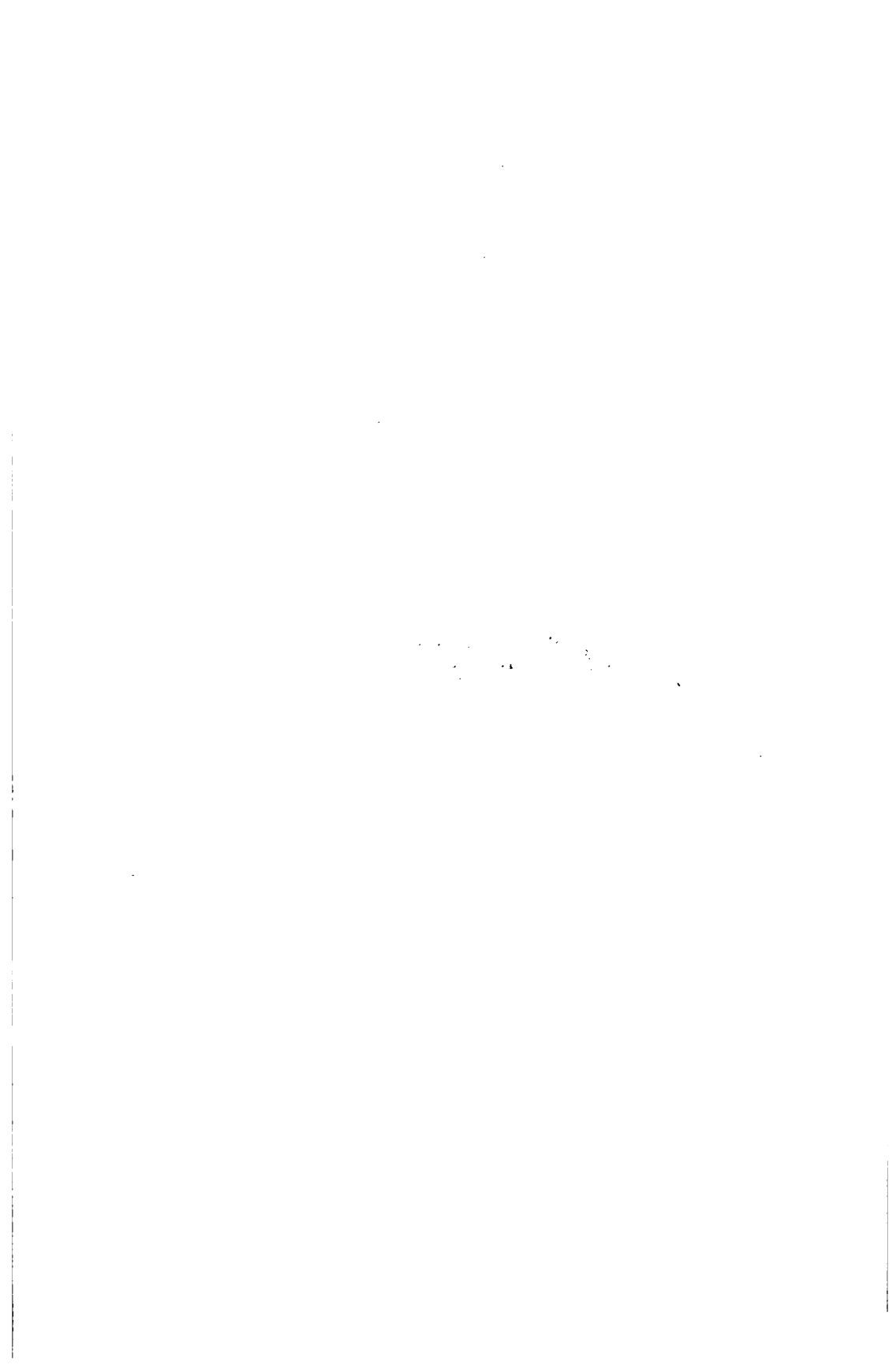
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Wm. Goodell

In addition.

WILLIAM GOODFELL 77

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ON the island of Malin, in the Macdonoughs, by historic emblems and dear to the hearts of the people, is the scene of the shipwreck of St. Peter, and its anniversary, the 1st day of October, 1829, a son was born to a poor fisherman, a child, who had been sent out by the Americans, to be recruited by the chances of war to pursue them in Mexico. Here William Goodell, the physician, first saw the child, the ambassador of the Prince of Peace, sent to rescue the world from the stronghold of the Great Serpent, and to bring forth the world with some impress of his birthplace, and to be a blessing to the world, would have sprung to life, even from the cold dead, to save the whole percentage.

and a warrior he was ; against the odds he fought
the battle ; fighting for the life and health of his
scent warfare, against diseases and the enemy
old, worn out with the struggle and exhausted by it,
his early life, of the promise of his life, and the

Amid the circle of the mission in Ceylon, where he had been first assigned; brought in contact with and with- in a strange people, and with persons of different races and in the ancient city, he could not but catch even in the very smallest somewhat of the Eastern spirit and the Oriental religion; and to this, no doubt, he owed as much as to his own intellect and vigour, when singled out as a young man, the claim of his speech, the solemn sanctification of his words, the solemn, but severely native—things which even his language could not fully do justice to.

• early education was conducted entirely by the father; son's education in college he had never attended a school, but the father taught him a lot on the topic of medicine.



Wm. L. Russell

In Memoriam.

WILLIAM GOODELL, M.D.

BORN 1829. DIED 1894.

ON the island of Malta, in the Mediterranean Sea, the field of so many historic conflicts, and dear to the heart of the Christian world as the scene of the shipwreck of St. Paul and its marvellous story, on the 17th day of October, 1829, a son was born to the missionary William Goodell, who had been sent out by the American Board to Beyrout, but forced by the chances of war to pass a year in Malta.

Here William Goodell, the physician, first saw the day,—child of the ambassador of the Prince of Peace,—amid the scenes of strife and in the stronghold of the Great Sea ; and surely, if birth ever marks a man with some impress of his birthplace, one might expect that a warrior would have sprung to life, even from such a God-fearing and peaceful parentage.

And a warrior he was ; against the old and effete, the traditional and the untrue ; fighting for the life and health of thousands, with incessant warfare, against diseases aforetime triumphant, till he fell on the field, worn out with the struggle and exhausted by the fight.

Of his early life, of the promise of his boyhood, we can gather but little. Amid the circle of the mission in Constantinople whither his father had been transferred ; brought in contact beyond and within its walls with a strange people, and with many men of many nations gathered in the ancient city, he could not fail to imbibe with the very air he breathed somewhat of the Eastern spirit and the Oriental mode of thought ; and to this, no doubt, he owed, as much as to inheritance, that marked individuality which singled him out among his fellows : the rhythm of his speech, the sonorous ring of his periods, the accent, not foreign, but scarcely native,—traces which even his long residence in America failed to obliterate.

His early education was conducted entirely by his father ; so that up to his entrance in college he had never attended a school, but almost from infancy he had chosen the profession of medicine.

At the age of eighteen he was sent to the United States, and soon entered as a student at Williams College, pleasant recollections of which continued through life, so much so that when stricken with what he himself suspected to be mortal disease, he spent his last summer, an almost hopeless sufferer, amid the surroundings of his college life, looking out upon the college green and girdled about with its halls. After graduating at Williams he matriculated at Jefferson Medical College, Philadelphia, obtaining his degree in 1854.

It had been his intention on graduation to return to his father's home in the Orient, and after his marriage in 1857 he settled down to a permanent practice in Constantinople, but though meeting with encouraging success, he decided to return to America. In Constantinople he had become well known, and his reputation at the time of his departure was well established, not only among the resident European, but with the native and Armenian population as well. A score of years afterwards, friends visiting there were frequently asked about his welfare and loaded with messages for him and requests for advice, so that it seems probable that, had he remained, the distinguished honors of his later years might still have befallen him in one shape or another. Some of his friends will recall how in after-life he would tell many curious and often ludicrous incidents of his Oriental practice, which plainly showed that the life of the practitioner in the East was in that day beset with danger as well as difficulty.

On his return to the United States for the second time, with his wife and child, he decided to locate again in West Chester, Pennsylvania, his wife's native town. But the road of a young man to medical success was very up-hill, even more so than now. Age inspired more confidence then ; youth excited more distrust. He became, after a time, dissatisfied with his surroundings, meditated going to the West, and was almost ready to depart when the position of resident physician in the newly-opened Preston Retreat was, through the influence of some of his friends, offered him. This he gladly accepted, bringing him, as it did, into the busy life and wide field of a great city, and insuring him at the start position, home, and a certain, if limited, support. But it was not in his nature to rest idly in a quiet berth, or to let the unoccupied moiety of his time go to waste. His hospital was organized and managed, under his watchful eye, on the soundest principles of hygiene then known. All that the science of the day could afford he applied so successfully that the records of his wards are, for their day and date, wonderfully good. Yet in his hours of rest he worked hard. He became a profound student in his own department, and from a student

a writer, his first appearance in medical literature, other than in a few reviews, being an article in the *American Journal of Obstetrics*, August, 1869.¹

His strong appreciation of the humorous could not easily be controlled in his literary efforts. It cropped out spontaneously in review articles, in short speeches, and addresses, and in his conversation would be always unexpectedly appearing. His wit was made doubly forceful by his telling voice and manner; but with it he possessed a dignity which never failed him. He rapidly made friends, and assimilated with the younger element then rising about the Old University, and to whom we owe that New University whose rise and growth have been so phenomenal. All those to whom the University owes its present standing and reputation were his friends, and he speedily became associated with them in their work.

It was in 1865 that he received the appointment to the Preston Retreat; in 1870 he was made lecturer on diseases of women, and in 1874 he was appointed the first professor of gynæcology in the history of the University of Pennsylvania, which position he held until his resignation in 1893.

It was the day of the dawn of the new science of medicine in all its departments. Marion Sims had set the gynæcologic world on fire with his inspiration, and he who was most worthy pressed most closely on his track. Dr. Goodell was the man for the moment; he saw instinctively the dawn of the new day. Progressive and aggressive, bold yet careful, quick yet painstaking, firm yet gentle, as time went on he speedily made his name *the* name in the new and renewed department of gynæcology, for gynæcology was new. It had as yet hardly received a name, and, though its germ may have lain latent in the teachings of Dewees and Hodge, the medical world stared astonished as the infant came vigorously to life.

Patients ere long flocked to Dr. Goodell from the city and from the country, from near and from far. His office practice grew rapidly; cases demanding operation came in numbers to Philadelphia to seek him, and for some years he employed neighboring houses as sanitarium, where he found them accommodation. As their numbers increased, however, he was forced to a more systematic plan. The building at 1927 Wallace Street was bought, altered and furnished, and remained until his death in active use.

¹ "Concealed Accidental Hemorrhage of the Gravid Womb, with One Hundred and Six Cases."

As an operator he was advanced, but never rash. Conservatism marked his character too deeply, and, while daily advancing on the crest of the wave, he ever exercised care and judgment. During these years of operative activity he added to the general stock of knowledge many valuable observations and many novel methods and measures, as in the management of the perineum, version in narrow pelves, his plea for the revived use of the tractor, and many others.

As a clinical lecturer he won the hearts of his students, by his fine delivery, his clearness, the practical character of his teaching, and by boldly admitting his mistakes. He talked aloud his thoughts. As his busy and skilful fingers went on in their work his mind spoke out in decision, in indecision, in error, and in triumphant success. He won their hearts, for they could see him as he was,—no lofty wall of reserve marking the vast difference between the great operator and the timid neophyte, but a *man*, pointing out the steps, the pitfalls of the road they travelled with him, and lending when most needed a helping hand and a hopeful word.

One remarked to the writer in those days that while a student of medicine in another college he had dropped in at Dr. Goodell's lecture-hour and sat spell-bound as he listened, for the lecturer, as he went on with the operation of the hour, revealed aloud his mental processes; all his sound thoughts, and all the wrong ones that might have beguiled him, told the mistakes he had made, warned them by sad example, and left them admiring and loving the fallible but great man within and above it all.

This mood he carried through life, pride in his work, mingled with a stern judgment of himself; and almost his last contributions to medical literature were great and noble acknowledgments, as he looked back on his busy past, of his errors,—grand confessions, that like many more he had often grasped after the truth, but failed to apprehend it; that his judgment had been many times at fault; in short, that greatness has its moments of littleness, and that decision may decide wrongly. This perhaps involved a condemnation of others as well, but the sting was removed by equal condemnation of self. Perhaps in all medical literature these articles, "The Great Medical Error of the Day," "The Conservative Treatment of the Female Pelvic Organs," and "What I have Learned to Unlearn in Gynecology," from a man, as he was, still in active life, are unique, and one cannot read them without feeling that they added the one touch needed, the one last touch to round out his character and show him truly great. Others may do great deeds but keep silence about little ones, make great successes

known but never speak of failures, gain credit for decision while victims of doubt, but the open-hearted and honest, it would seem to us, rather than the meek, still inherit the earth, and possess also that grandest inheritance which neither laws nor custom nor death can take away,—the loving remembrance of mankind.

In personal appearance Dr. Goodell was impressive ; slightly above the average height, florid in complexion, with large, strongly-marked features, bright eyes, and a quick movement. His manners were courtly and studied rather than graceful, for he was no parlor knight, Abrupt at times, distraught at times, with a weight of care, responsibility, and overwork ; worried with a thousand details in the busiest of busy lives ; entering on the rush and whirl of modern competitive life at an age when many think of withdrawing from it and of coming ease and rest, the twenty years from his first venture in the operative field to the last weary breath he drew compressed in themselves the work of many busy lifetimes : and what work ! Others now may claim higher successes, science ever improves on itself. None can fairly contrast the results of to-day with those earlier successes and failures, when the road was strange and the morning light uncertain. Even the prize of to-day is gained by the failure of yesterday. Certain it is that he was never guilty of suppressing his failures or eliding them in mysterious ways. He did not refuse bad cases for the sake of the beloved record, or deny a suffering woman her one chance in ten or an hundred, lest the brightness of his statistics should be tarnished. One cannot estimate a man's value to his community by percentages. He had no latent cunning or concealed artifice, nor did his mind work in devious ways and byways, the absence of these traits made him a perpetual enigma to those who possessed them. They looked in vain for hidden motive of speech or deed where all was open. In dealing with his patients he was straightforward and plain spoken, duplicity and concealment he met so directly that confusion overwhelmed those who so often impose on professional men and made them ever afterward open or latent foes.

The labor of his practice was enormous, and for years he seldom delegated any important work to his assistants. The Preston Retreat, with its enormous aggregate of two thousand three hundred and twenty-four cases during his twenty years' residence (and the greater proportion of these in the last eight or ten years, when his reputation had spread as an obstetrician among the poorer classes, and difficult cases went there of their own accord for the benefit of his skill), his many private cases, his sanitarium, his immense office clientele, his

lectures, his clinics, his consultations in the city and at a distance, many of them necessitating operations, many of them in difficult obstetrics, his literary work, attention to the medical societies with which he was connected, and the various public speeches demanded of a man of his position, ability, and readiness, all these formed an incessant round hard for a man of herculean strength and perfect health, still in his youth and prime, but doubly hard for one never strong but in resolution and determination, and for years battling with insidious disease.

Far too late he recognized that no one man can be all things to all men. He resigned his position at the Retreat, and purchasing the house 1418 Spruce Street, devoted himself more exclusively to operative gynaecology. The change of location while beneficial in many ways added in others to his work, removing him as it did so far from his sanitarium, but it left him with freer hands and more unmortgaged hours. Many times he would have resigned his professorship at the University had he consulted only his own wishes, or had he realized his condition, but like all men he was reluctant to abandon position and influence, or admit that strength was failing and age—all untimely—advancing with rapid step. Ultimately, in 1893, he was obliged to give up his lectures and clinics. From his toil, in later years, he sought rest in short summer holidays in America or Europe, and a few times in midwinter he spent a few days in the South; but even his vacations were broken by work, unwilling as he ever was to deny his advice and help to any urgent professional brother.

Premonitions of approaching danger, signal-lights of constitutional peril, appealed to him in vain. Like most active men, while living with the mirage of future ease and retirement in view, he willed with stronger will to work on to the end and die in working. His last summer spent, as we have mentioned, in Williamstown, Massachusetts, was one of almost continual suffering, physical and mental, and he lived but a few short weeks after his return, showing to the last in all his general enfeeblement the great traits of mind, triumphant over disease and pain, which had made him what he was to the world and to those more nearly associated with him. His death occurred on the 27th of October, 1894, and on October 30 he was buried in Woodland Cemetery in sight almost of the field of work dearest to his heart.

“His literary record is comprised in many current articles, editorials, published lectures, in his work on Gynaecology, and in many reported cases of obstetrics and gynaecology,—in all over one hundred articles, most of them written with great care and pains, and all dis-

playing that originality of thought and boldness of expression which were so characteristic. The amount of published material is great, especially as it is his own personal work and thought, and does not, as so often, consist of compilations of the thought and work of others.

In impromptu speech he was ready, witty, and forcible; in his studied addresses and papers thoughtful and profound. His style was classical, and he took great pains in writing to attain the manner which he coveted, and to do his best with the gifts nature and cultivation had so richly bestowed upon him.

To his professional brethren Dr. Goodell was ever kind and considerate. For years in his position at the Retreat he was the favorite consultant in that section of the city for difficult cases. He was always ready, unsparing of strength and skill, and his relations with the profession at large were marked by the same natural and native courtesy. Many a hard-worked doctor, calling in his aid for some difficult case in some narrow street, has seen him refuse his well-earned fee lest he should indirectly rob his professional brother. For many years he received all operative cases, no matter what their station and pecuniary ability, bestowing on all equal care, and refusing, often, after operations, the proffered fee when he believed it to be paid with difficulty. Of his well-employed and busily-occupied hours he was ever generous, with that real generosity which knowing the value of time so well, yet gives it freely when needed.

As a companion in his hours of relaxation he was delightful. All the varied experiences of life which had been his were at his command. His thought was cosmopolitan, his outlook on life never narrow. The genial qualities of his mind shone out in conversation, for his intellect was not fettered by habit or walled in by his profession. In medicine only was he a specialist. Even there his greater value came from his wider view. He was master of several modern languages, French, Turkish, and Armenian; he appreciated music and literature, though his time for the enjoyment of either was so limited, and he took an interest in the world's daily life, and was keenly alive to its passing incidents. His mind was by nature and training deeply religious in its bent.

What a happy life! what a fortunate life! the world will say. As a surgeon he attained what men call great success; his was an active, useful, brilliant life in their eyes. But we say, rather, what a *blessed* life for *others*! but for himself only a few years of hurry, weariness, and slavery, with the whole world of men and women for master, claiming service day and night, while minutes were hoarded and dispensed

grudgingly, for were they not blood-drops? The medical Aladdin, whose rise and success astound us, is himself the slave of the lamp,—of the telephone, the telegram, the door-bell, the messenger, the post-man, the world.

So lived and died one of the marked men of his generation,—a pioneer in the field of modern medicine. His voice, so sonorous, is hushed; his deft fingers can no more exhibit their skill to the admiration and instruction of hundreds of eager students; women relieved of years of pain can no longer lift to him their grateful eyes, but his impress on the living world ceases not with his life, or even the memory of his name; because of him, and men like him and their work, future generations will, though they know it not, attain to greater heights, and long after he has fallen the wave he has set in motion will still be travelling, uplifting generations on its bosom to the confines of the world.

“How soon we are forgotten!” has become a truism, but it is not always true. The next generation may not miss the valued men of this, for they have never depended on them, but contemporary life will grieve more deeply as the days go by,—will miss more surely as the years fly on. One more support, one more strong arm on which to lean, is withdrawn, and the new ones proffered so kindly are strange. There is still need, more need than ever, of the conservative surgeon, bold yet wise; for modern teaching makes the new age too aggressive in its attack upon disease. No longer will it ever wait for patient nature as a helper; no longer will it ever counsel otherwise than for radical measures. “Ablate,” not “wait,” will be the motto of modern surgery, till it too mellows with age and dies regretted for its matured wisdom and its wise conservatism. The men of his day will miss the wise counsel of William Goodell; the men of to-morrow, as their numbers thin, will miss as much those who then represent all that in him we hold to have been most valuable. Fortunately for the world, he was a teacher, reaching with his telling voice and earnest words thousands of eager ears in the course of his career, and the impress of the true teacher of to-day on the world of to-morrow, and a thousand to-morrows, can never be lost. His methods may grow obsolete, his facts be proved false, but the impulse he has given to human thought will be handed on from generation to generation.

EDWARD W. WATSON.

Treatment.

THE CAUSES AND TREATMENT OF SOME OF THE MORE COMMON FUNCTIONAL DISORDERS OF THE HEART.

BY N. S. DAVIS, M.D., LL.D.,

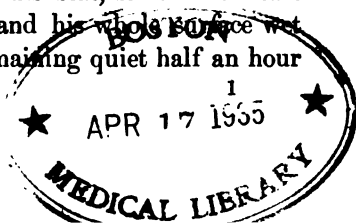
Chicago, Ill.

FROM a wide range of clinical observation, in both hospital and private practice, I have been convinced that nearly all of the more common functional disturbances of the heart are capable of being arranged in four groups,—namely, first, those caused by excessive physical exercise accompanied generally by high temperature; second, those resulting from protracted mental activity coupled with anxiety or apprehension; third, those caused by reflex nervous influences originating in primary disorders of the digestive or generative organs; and fourth, those caused by defective conditions of one or more of the constituents of the blood.

Cases belonging to the first group have been most frequently noticed by military surgeons, as occurring among soldiers while performing long and rapid marches during the summer heat. A few cases of this class have come under my observation almost every year that had been produced by severe and protracted physical exertion in endeavoring to stay the progress of forest fires in the lumber regions of Northern Michigan and Minnesota.

They are also occasionally met with in persons engaged in the various occupations of life, as the following case will show:

CASE I.—Mr. D., aged sixty years, enjoying good health and accustomed to active out-door exercise, was induced to run a mile during the warm summer afternoon, in order to take a particular railroad train into a neighboring town. He entered the car as it was moving from the platform, and on taking his seat, found his heart beating violently, his breathing oppressed, and his whole surface wet with a very profuse perspiration. After remaining quiet half an hour



the breathing had become natural, the cardiac impulse much less forcible, but rhythm irregular with frequent intermissions, and on arriving at the end of his journey he proceeded quietly to complete the business of the day. After sufficient examination to feel fully assured that no permanent cardiac dilatation or valvular lesions had occurred, he decided to continue his daily routine of active business and plain temperate living as though nothing had occurred, except to carefully abstain from all running or other violent exercise. No medicine was taken and not even one day devoted to entire rest in the recumbent position.

During the first three weeks the cardiac beats continued variable as to time, and omitted every fourth or fifth beat both night and day, but the health otherwise continued good. Subsequently a slow improvement took place, but at the end of one year the heart still omitted an average of one beat in seven, but the intermediate beats were quite uniform. At the end of the second year the cardiac functions were so nearly complete that it required the counting of from thirty to sixty beats to detect an omission, and now, after the lapse of fifteen years, the patient suffers from no cardiac disturbance or irregularity, though over seventy-five years of age.

From carefully noting the entire course of this and several other cases of decided disturbance and irregularity of the action of the heart caused by excessive physical exertion, I am satisfied that little or no medicine is required for their successful treatment, provided the patient can be fully satisfied that his case involves no danger to life, and he will abstain from all excesses and irregularities in both exercise and habits of life. In a few cases I have found such a degree of mental timidity, however, that the cardiac disturbance interfered with needed sleep at night, and have remedied the difficulty by giving ten grains (0.6 gramme) of potassium bromide and ten minims (0.6 cubic centimetre) of the tincture of digitalis near bedtime each evening. In another case I found the patient greatly comforted by taking fifteen drops (1 gramme) of an equal mixture of fluid extracts of *pulsatilla* and *cactus grandiflora* three times a day.

The second group of cases, which I have regarded as resulting from protracted mental activity and generally accompanied by anxiety or apprehension of some impending evil, is much larger than the first, and its members may be found in all ranks of society, from those in the hovels and crowded tenements where the poor mother sits, day and night, watching her sick children, to those in mansions on the avenues where equally faithful mothers keep protracted vigil night after night for the return of half-intoxicated husbands from the club-house.

Sooner or later these cases come to their physician filled with anxiety lest they have serious disease of the heart, because they have become almost constantly troubled with a sense of heaviness across the chest and a pain or some kind of morbid sensation under the left breast, and frequent temporary spells of quick beating or palpitation of the heart. Plenty of cases belonging to the same group may be found among those actively engaged in the various lines of business, especially during times of financial embarrassment, when the business man or woman allows the problems of success or failure to engross most of the hours needed for sleep, until the overtaxed brain radiates excited and irregular impulses through the pneumogastric system of nerves, causing a variety of morbid sensations in the chest, the epigastrium and the cardiac region, until they create in the mind of the individual a predominating idea of the dreaded "heart-disease." Even among the youth of both sexes in the higher educational institutions of our country may be found many cases of the same group induced by persistently extending the hours of study far into the night, and leaving inadequate time for either sleeping or out-door exercise. Many such, before having half completed their collegiate or academic courses of education, become troubled with mental despondency, inability to make continuous mental application, accompanied by quick and variable action of the heart and some degree of insomnia, until they become strongly impressed with the idea that they are laboring under either serious *nervous prostration* or *heart-disease* or both. But whenever any of the members of this group of cases, whether young or old, come to us for advice, the most patient and accurate application of auscultation and percussion fails to detect any evidence of structural disease of the heart or of the larger blood-vessels.

The principal variations from the natural conditions are habitual increased frequency and shortness of systolic contractions, increased to temporary palpitations by exertion or extra excitement, and an ill-defined feeling of oppression or weakness in the left side of the chest and epigastrium. In a very large proportion of these cases there are co-existing symptoms of the imperfect digestion of food, inactive condition of the bowels, and disordered secretions, so much so, indeed, that the gastric disorders are often regarded as the primary disease, and the entire treatment is aimed at their correction. But when the unfortunate patient has had his stomach plied in succession with the whole list of pepsins, peptones, antiseptics, liquid beef, predigested foods, and *wines* too numerous to mention, aided by frequent gastric lavements, he finds himself substantially in the same condition of health as when he began.

The obvious reason is that the gastric or digestive disorders, like the cardiac, are dependent on excessive mental occupation and anxiety with deficient out-door exercise, and consequently less reception and internal distribution of oxygen from day to day. There is no fact in physiology better established than that the presence of a natural proportion of oxygen in the blood is necessary for the maintenance of nerve sensibility, muscular force, and molecular and metabolic action in the processes of nutrition, secretion, and waste. It is an equally obvious fact that during continuous mental application, anxiety, or depression the respiratory movements are less in depth and efficiency, and in consequence the air is less changed in the pulmonary air-cells, and less oxygen is imparted to the blood. When to the diminished respiratory efficiency have been added deficient exercise and sleep, disturbances of the vasomotor, cardiac, and digestive functions inevitably follow; and no amount of peptonoids, artificial foods, or nerve tonics will afford the needed relief while the primary causes remain operative. But whenever the mind can be liberated from its excessive application and anxiety, and given adequate time for sleep at night, and the body a reasonable amount of daily out-door exercise the recovery of the patient will be rapid and satisfactory. This was well illustrated by the following:

CASE II.—Miss B., aged twenty years, had been constantly engaged for two or three years in a dressmaker's shop, with no other exercise than walking a few squares to the shop in the morning and back in the evening. From a state of good health and spirits when she first entered the shop she had gradually grown pale, with countenance sad and dejected; appetite capricious; stomach feeling full even after a small amount of food, and frequent gaseous eructations accompanied by paroxysms of cardiac palpitations, especially after lying down at night, and during the last three or four months she had been unable to sleep. Her bowels were inactive, and she had frequent dull headache. The recent insomnia with increasing cardiac disturbances had led her to entertain a strong belief that she had a dangerous "heart-disease." She had already taken laxatives to regulate the bowels, a long list of drugs to promote digestion, and several hypnotics to induce sleep, but with only partial temporary relief. After a careful physical examination of the chest and its contents, I assured her she had no structural or dangerous disease of the heart, and that all the distressing functional disturbances from which she suffered had originated from close mental attention to her work and too constant confinement in-doors, by which she had received less oxygen of the air through the lungs into her blood daily than was necessary to sustain

the sensibility and activity of the nervous and muscular structures of the body, and that it was the same deficient supply of oxygen in the blood that led to diminished secretion of the gastric juice and diminished peristaltic motion of the stomach and intestines. In other words, it was the daily reception and internal distribution of an insufficient quantity of oxygen of the air that caused her indigestion, constipation, headache, palpitations, and insomnia, and sent her home every evening tired, and caused her to rise in the morning feeling more tired than when she went to bed. When I assured her, further, that the only efficient and permanent remedy for her was an adequate daily supply of fresh air and regular exercise of the chest, like all similar patients, her ready reply was that she had no means for support but her work, which required her to be at the shop from 8 A.M. to 6 P.M., thereby leaving her no time for physical exercise or fresh air. However, I insisted that she actually had sufficient time at her command without interfering with any of the hours allotted to work, for all the exercise she required to regain and perpetuate good health. I advised her to rise at six o'clock every morning, and before dressing spend from two to five minutes in taking full inspirations and free exercise of the muscles of the chest and arms ; then complete dressing and take her breakfast at a quarter before seven o'clock, which would leave her from half to three-quarters of an hour for free out-door exercise before she reached the shop at eight o'clock. On returning home at 6 P.M. to take her evening meal and after resting an hour, go out, and, with unrestricted chest and waist, take sufficient active exercise to start perspiration, even in cold weather, then retire to bed in good season, and she would soon sleep soundly every night, and rapidly regain health and strength.

To temporarily aid the digestion of her food and favor more regular intestinal evacuations I directed her to take a gelatin capsule after each meal, containing two decigrammes of pepsin and two centigrammes of leptandrin. Three months later I saw her looking greatly improved, and in answer to my inquiries she said she had followed my directions faithfully, even to the out-door evening exercise before retiring for the night, and had no longer any insomnia, indigestion, or palpitations. The history of this case clearly sustains two important propositions : first, that there are very few persons, even among the working-classes, who do not have time enough for full healthful exercise if they know how and when to use it ; and, second, that no chronic functional disturbances of the heart or other organs can be permanently removed by the use of drugs without at the same time suspending the further action of the causes on which they depend. Consequently, the physician will suc-

ceed best in treating all such cases who studies most carefully the causes, both mental and physical, that are interfering with any one or more of those physiological processes on which health depends, and patiently instructs his patient how to avoid their further influence.

But as I have already written as many words as the editor allotted me space for, I must postpone the consideration of groups third and fourth until a future time.

THE TREATMENT OF ENTERIC FEVER.

BY JAMES C. WILSON, M.D.,

Physician to the German Hospital, etc.

BETWEEN February 1, 1890, and October 1, 1894, there were treated in the German Hospital of Philadelphia by systematic cold bathing, in accordance with the method of Brand, four hundred and eight cases of enteric fever. This period of time covers, in addition to the ordinary endemic prevalence of the disease, several outbreaks amounting to epidemics. The number of cases is now sufficiently large to justify conclusions as to the effect of this method of treatment (1) upon the symptoms of the disease in individual attacks and (2) upon the death-rate.

These constitute the only reliable tests of the efficacy of treatment. Both of them require large collections of cases to become available; the first test—namely, the effect upon the symptoms in individual cases—being influenced both by the well-known variations in the intensity of this as of other infectious diseases in different cases and epidemics, and by the personal equation of the observer; the second test, the influence upon the death-rate, being affected simply by the irregularity of the mortality of the disease. Thus, in the first series of patients treated by this plan there were forty cases without a death, in the second series there were fifty-four cases with a single death, whereas in the sixth or last series, covering a period from June 1, 1893, to October 1, 1894, there were one hundred and eight cases with no less than twelve deaths, while in the four hundred and eight cases there were thirty-two deaths—7.8 per cent.

These figures demonstrate the worthlessness of the death-rate as a test of the efficacy of any particular treatment in short series of cases. I think it would be well if practitioners would generally recognize the fact that in the infectious diseases, and especially in enteric fever, the recovery of fifty or sixty consecutive cases is no test of the efficacy of a plan of treatment. Statistics of short series of cases numerically much below these figures are absolutely without avail, no matter how carefully recorded. The death-rate as a test of the value of a plan of treatment becomes important, as here, in series of consecutive cases

numbered by hundreds. This is particularly the case in the treatment under consideration, which being a routine treatment has been rigorously carried out by many different observers in distant parts of the world with a striking uniformity of result. To illustrate, I may call attention to the fact that Osler, at the Johns Hopkins Hospital, reports a mortality of 7.1 per cent., Tripier and Bouveret, at Lyons, a mortality of 7.3 per cent., while Hare, in Queensland, with a large collection of cases, has reported a death-rate of 7.84 per cent. It would thus appear that statistics giving the aggregate of the observations of clinicians working independently of each other are in close accord, and show a reduction of the mortality as compared with other forms of treatment, including the expectant and expectant-symptomatic methods and so-called antiseptic methods, both intestinal and systemic, amounting to about fifty per cent.,—that is to say, between seven and eight per cent. as compared with fifteen or sixteen per cent. and upward. I have so often in previous publications dwelt upon the importance of this reduction in the mortality of enteric fever both from the stand-point of human sentiment and that of economics, that it is unnecessary to enlarge upon it here. Enteric fever selects a large proportion of its victims in the periods of adolescence and early adult life. The fatal cases rob us of our best, those whose training has fitted them for the widest usefulness or those who are already the centres of hope and dependence. Even the non-fatal cases involve weeks of suffering and tardy months of feebleness and disability. It is not easy to estimate the pecuniary loss to any community caused by the endemic prevalence and occasional epidemic outbreak of enteric fever. Still more difficult is it to count the cost of the deaths from this pest. How shall we, then, determine the value of a method of treatment that reduces the mortality fifty per cent.? And this the Brand treatment has done whenever it has been systematically carried out. It is no longer a matter of enthusiasm, the fad of its originator or of a few clinicians; it is a matter of demonstration. That a treatment capable of so affecting the mortality has not come into general use is accounted for by several facts. First, it is contrary to traditional and generally received methods of treatment; second, the effect of the individual bath is often disagreeable to the patient and startling to the by-standers. The shock of the plunge into cold water, the shivering and cyanosis, the change from the warm bed to the cold water not only, but the change of posture and the movement, violate every preconceived notion as to the management of fever patients. Finally, the treatment demands an amount of labor and trouble not always acceptable to those in charge of the case.

But what are the results? Not only a reduction by one-half in the death-rate, but the most remarkable changes, if I may use such an expression, in the physiognomy of the attack. The features of classical enteric fever—the typhoid fever of the text-books—are only exceptionally seen. Each bath reduces the temperature, at first but little and for a short time, presently more and more, with a slow return to the fastigium, so that a continuous or subcontinuous temperature curve is in the course of a few days, even in severe cases, changed to the remittent curve. Coincidentally with this, the headache disappears, the tongue becomes moist, the pulse becomes fuller and stronger, dicrotism disappears, pulmonary hypostasis is reduced to a minimum. The later morbid phenomena as usually seen are averted; tremor, delirium, and subsultus are rarely seen. The brown tongue, the distended belly, and diarrhoea scarcely ever occur. The individual bath is followed by a reaction which brings with it refreshing sleep, from which the patient is aroused with bright eyes and a clear mind. There is ability to take and digest food; very often there is appetite, even hunger, throughout the attack. The so-called “typhoid state” is rarely seen.

The reduction in the mortality observed by Brand and others in military practice, where the treatment is instituted at the beginning of the attack, not later than the fifth day, does not occur in hospital practice in this country. Seven or eight cases out of every hundred, it is true, die, but they are, as a rule, cases in which from the beginning there have been the evidences of a most profound infection, or in which local accidents, as intestinal hemorrhage or perforation, determine the fatal issue, or in which grave complications, such as pneumonia, meningitis, or nephritis, cause death.

The world awaits a method of treatment which, systematically applied to large numbers of consecutive cases, can show better results than that which we owe to Brand. To preventive medicine, however, we must constantly turn. The word is not to cure but to prevent. History, which ever repeats itself, will in due course of time repeat itself in the case of the great endemic fever of our time. I turn with satisfaction to the history of the plague in Europe, to the history of typhus, to the history of leprosy in Great Britain. Each of these was the endemic scourge of its time, and each, under changed and better methods of living, has disappeared. Let us not only confidently hope to see enteric fever, the spread of which is peculiarly favored by modern methods of living, ultimately disappear, but let us continuously strive to hasten the coming of that fortunate day.

SPASMODIC CROUP.

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SPASMODIC or false croup is variously known as cerebral croup, suffocative laryngismus, laryngismus stridulus, and spasmodic laryngitis; names which show that a good deal of confusion exists among different authors as to the true nature of the disease. The spasm of an acute laryngitis is evidently the result of different conditions from those which obtain in the poorly-nourished, rickety child with cerebral disease and no inflammation of the larynx. Notwithstanding this confusion of terms, it seems best to consider the two conditions as one and the same disease under the name of spasm of the glottis, or spasmodic croup. It should be understood, however, that in one variety of this affection, which is properly termed laryngismus stridulus, we have to deal with the purely nervous affection, and in the other, which, for the sake of clearness, we will speak of as spasmodic laryngitis, we have more or less inflammation and congestion of the mucous membrane. Either of these conditions are characterized by sudden, temporary, complete, or incomplete spasmodic closure of the glottis, or vestibule of the larynx, preventing free inspiration; attended in the former case by cessation of the respiratory movements, and in the latter by stridulous respiration almost identical with that of true croup, but closely simulating the peculiar stridor heard during whooping-cough. Laryngismus stridulus may be considered a purely nervous disease, and not long ago it was believed that it always came from cerebral disorders. It is now known that it is often due to direct or indirect peripheral irritation from a great variety of causes; for example, pressure on the recurrent laryngeal nerve, the presence of irritating substances in the alimentary canal, or irritation of the gums in dentition. It is also stated that hyper trophy of Luschka's tonsil is a not infrequent cause of these attacks.

Spasmodic croup occurs most frequently during the winter or the

damp and chilly weather of the fall and early spring. It is most common in children during the second year of life, though it is quite frequent during the third or fourth years; it is occasionally met with in the fifth and sixth years, and sometimes even in older children.

True spasm of the larynx, not very different from the false croup of children, is rarely witnessed in adults. I have seen but one case, which occurred in a woman over sixty years of age.

Laryngismus stridulus is most often observed in weakly and immature children. Spasmodic laryngitis is frequent in vigorous children, and is said to be more common among boys than girls. The latter affection not infrequently attends a simple catarrhal inflammation of the larynx, and it is one of the early symptoms in some cases of whooping-cough and measles, in either of which conditions it may be excited by mental or physical irritation of the child. With nursing babes the spasm is frequently brought on by entrance of a little milk into the larynx or by dandling the child in the arms.

The child's larynx is relatively smaller than that of the adult, therefore it is more easily obstructed by congestion or swelling of the cords or ventricular bands. O'Dwyer maintains that the obstruction is commonly located in the narrowest part of the air-passage at the cricoid cartilage, in which position swelling of the mucous membrane enclosed in an unyielding cartilaginous ring must necessarily greatly narrow the calibre of the tube. In examinations after death from laryngismus stridulus the mucous membrane is commonly found unusually pale, and the same appearance may be observed in some cases of an inflammatory character, depending upon the elasticity of the submucous tissues of the larynx and the time at which the post-mortem examination is made.

In spasmodic laryngitis the mucous membrane is hyperæmic, varying in color from slight redness to deep congestion. It is commonly dry, and the congestion usually extends over the entire surface of the larynx and even the trachea, but it may be limited to the epiglottis or the ary-epiglottic folds or to the false or true cords.

Inflammation of the mucous membrane of the larynx follows much the same course as inflammation of the trachea or bronchial tubes. The dryness and congestion of the first stage, if life is prolonged, is succeeded by increased secretion with tenacious mucus and later by muco-pus. The inflammation is mostly confined to the mucous membrane, though it is probable that the spasm in many instances is the direct result of extension of the inflammation from the mucous membrane to the muscles beneath.

Heredity must be reckoned among the predisposing causes, as certain families seem peculiarly prone to this affection. In individuals a tendency to recurrence sometimes extends over many years. Laryngismus stridulus is thought to be often excited by much the same conditions as spasmodic laryngitis, but the latter commonly has as a predisposing cause local inflammation, resulting from exposure to cold or dampness or the inhalation of irritating vapors, steam, smoke, dust, etc. Irritation in the alimentary canal from undigested food is one of the most frequent exciting causes of the spasm in either case, which explains the rationale of the treatment so commonly and effectively adopted in spasmodic croup. Laryngismus stridulus usually occurs during the small hours of the night, the child having been put to bed in apparent health, though in some cases it may have appeared peevish for a day or two previously, or possibly there may have been observed slight catching in respiration during nursing or when it was excited.

When the attack comes on the child is suddenly awakened with a sense of choking which causes it to make a few short spasmodic efforts at respiration, followed by a long crowing inspiration which has given rise to the term "child crowing." Closure of the glottis speedily becomes complete and respiration is suspended, the eyes stare, the child clutches wildly at the nurse or anything in reach in its efforts for breath. The face, which was at first pale or flushed, upon cessation of respiration becomes livid, the eyes roll or are turned upward, the head is retracted, and in severe cases there is marked opisthotonos. Commonly the thumb is bent into the palm of the hand, and the fingers are flexed over it; the great toes are abducted and the others flexed. General convulsions sometimes immediately succeed, and may prove fatal, but in less severe cases within a few seconds the spasm relaxes, a crowing inspiration is heard, the child breaks out in a fit of crying from fright, or has a spell of coughing, and shortly afterwards falls again into a sound sleep, from which it may again be awakened within an hour or two with a similar attack; or it may sleep quietly until morning. The attacks are likely to be repeated the following night, and in severe cases on succeeding nights. During the spasm the pulse is small and feeble or perhaps imperceptible. There is usually no increase of temperature, and when fever is present it ordinarily results from irritation of the intestinal canal or other causes which may have brought on the attack. Sweating of the head is a frequent symptom in children subject to laryngismus stridulus, as it is in subjects of rachitis, and it is probably due to the same causes.

The prognosis depends upon the severity and frequency of the

attacks. In a few cases, as in one which I witnessed in a poorly-nourished child about two years of age, the first attack proves fatal within a few seconds; in others, the second, third, or fourth paroxysm terminates in death, this result, according to Solis-Cohen, being due in some cases to impaction of the epiglottis in the chink of the glottis.

In spasmodic laryngitis the spasm is practically the same as in laryngismus stridulus, but it is often preceded by slight hoarseness for a day or two, and is followed by indications of catarrhal laryngitis with hoarseness or perhaps complete aphonia. In such cases the face may be slightly flushed, the hands hot, and the temperature half a degree or a degree higher than natural. Either of the varieties of spasmodic croup is not likely to be confounded with other diseases, excepting true croup, from which, as a rule, they may be diagnosticated by the slight amount or the complete absence of fever and the intermittence of the symptoms between the paroxysms together with the absence of false membrane. In cases where there is considerable catarrhal laryngitis, fever and hoarseness may remain during the following day; then the diagnosis must depend upon the history and characteristic symptoms of the attack and the exclusion of true croup. Usually when hoarseness continues for twenty-four or thirty-six hours, the child is suffering from true instead of false croup, but in severe cases of catarrhal laryngitis attended by spasms the symptoms are so nearly like those of true croup that it is sometimes impossible to make a correct diagnosis.

The paroxysms last but a few minutes, but they may recur after a few hours or the following night, or in severe cases they may be speedily repeated. Sometimes convulsions follow each other rapidly, and after a short time an especially severe convulsion terminates in death. In the milder forms of the disease recovery is common, but in laryngismus stridulus, and in severe cases of catarrhal laryngitis with spasms, fatal results not infrequently occur either during the first attack or during the second or third. In cases depending upon digestive disturbances or slight irritating causes, the prognosis may generally be considered favorable; whereas in those depending upon cerebral disease, or in which the paroxysms are severe or the intervals between them short, a fatal result commonly follows. As a rule, the longer the intervals between the paroxysms and the slighter the individual convulsions, the better the chances for recovery.

Treatment.—During the paroxysm the treatment is essentially the same, whether it be a case of spasmodic laryngitis or laryngismus stridulus. In laryngismus stridulus during the interval, the treatment

should be directed to the child's general condition, the most reliance being placed on vegetable tonics, the bromides, cod-liver oil, and the hypophosphites.

In spasmodic laryngitis during the interval, the child should be protected from exposure to cold, or to the irritating influences of dust, smoke, or gases, and especial care should be taken of the digestive organs.

When parents have a fear that spasmodic laryngitis is coming on, as indicated by slight hoarseness and restlessness, it is well to administer a mercurial cathartic for the purpose of unloading the alimentary canal, and at bedtime a full dose of the bromide of potassium and sodium combined, with or without small doses of tincture of belladonna. In some cases it has been found particularly beneficial as a prophylactic to administer to such children, three times daily, from half a teaspoonful to a teaspoonful of malt or maltine with hypophosphites. This preparation has seemed to me more valuable than cod-liver oil, though the latter is highly recommended by most authors, and is, perhaps, more commonly relied upon than any other remedy. As these spasms are believed to be caused, in some cases at least, by enlargement of the thymus gland, remedies calculated to reduce this would be appropriate: of these, the iodides in some form are proper, as, for example, the iodide of sodium in moderate doses, or the syrup of hydriodic acid, or syrup of iodide of iron, in proper quantities. The chloride of calcium has a marked influence in reducing enlarged glands, and may appropriately be added to the preparation of malt, or malt with the hypophosphites. The very marked influence of desiccated thyroid glands or of thyroid extract in reducing enlargement of the thyroid gland indicates that they might be useful in this disease whenever it is dependent upon enlargement of the thymus gland; therefore I would recommend their trial in cases of young children subject to spasmodic croup where slight dulness at the upper part of the sternum indicates enlargement of the thymus. The desiccated thyroids should be given three times daily to children two or three years of age, in doses of about one-third of a grain, which is equivalent to about one-eighteenth of the average-sized single lobe of a sheep's thyroid gland.

During the paroxysm, flagellation of the body and dashing of cold water into the face are among the most common remedies, and they undoubtedly have some influence in terminating the spasm. If, however, when the spasm is relaxed, the child should not begin to breathe, artificial respiration should be immediately resorted to, and I have no doubt that in many instances it might succeed in saving the child's life

if the parents knew how to employ it. When the spasm has ceased, as it will in the course of two or three minutes, remedies must be administered to prevent recurrence. It is seldom that the physician sees the patient before this interval. In the majority of cases nothing is better to relieve the dyspepsia and prevent return of the paroxysms than the old-time remedy of compound syrup of squills with syrup of ipecacuanha. I am accustomed to recommend a combination of these two in equal parts, and to give the child, according to its age and the severity of the attack, from half a teaspoonful to a teaspoonful of the mixture every fifteen minutes until vomiting occurs. This relieves the stomach of any irritating matter that it may contain, and the antimony contained in the compound syrup of squills relaxes the muscular system. Sometimes tickling the fauces with a feather or the finger is sufficient to excite vomiting, which of itself may check the tendency to spasm. Apomorphine in minute doses has been recommended to be given hypodermically, and turpeth mineral in doses of from half a grain to two grains, or even more, is frequently recommended, and is undoubtedly a most useful remedy, the only objection to it being that if it is not promptly vomited it may have a poisonous effect. Teaspoonful doses of powdered alum usually act promptly and efficiently in emptying the stomach. To relieve the paroxysm itself, a hot bath or a hot sitz-bath at 95° F. may be employed; or chloroform or ether may be administered as an inhalation so long as any efforts at respiration continue. An enema containing from twenty to thirty drops of tincture of assafoetida in an ounce of warm gruel or milk may act very efficiently in preventing a return of the paroxysm. Tincture of musk is also valuable for the same purpose; but among the simpler methods, and those which will usually be found efficacious, are hot or cold applications to the throat, and internal administration of the bromides with belladonna.

The plan which I commonly employ in children subject to spasmodic croup is to give the parents a solution of equal parts of bromide of potassium and bromide of sodium, about three grains of each to a teaspoonful of water. If the child appears a little hoarse or "croupy" at night, they are directed to give it a teaspoonful of this mixture, providing the child is five or six years of age, or less if it be younger, and to tie a large silk handkerchief about the neck on putting it to bed. This will commonly prevent a paroxysm during the night. In severer cases minute doses of tincture of belladonna are added to this prescription, and if the child becomes very "croupy" or a paroxysm actually occurs, the neck is swathed in large hot fomentations, or, in

rare instances where fever is present, cold is employed in a similar manner. The compound syrup of squills and syrup of ipecacuanha are given at the same time in doses sufficient to produce moderate relaxation, but not large enough to cause great depression. Children who have had an attack of spasmodic laryngitis should be carefully guarded from any exposure for five or six days succeeding, and should generally receive the constitutional remedies already indicated.

Whenever in the families of any of our patrons children are found subject to spasmodic laryngitis, we should give the parents prescriptions for the bromides and for the syrup of ipecacuanha and the compound syrup of squills, which should be kept constantly on hand, and we should instruct them in the methods of artificial respiration to be employed in serious cases.

If in either spasmodic laryngitis or laryngismus stridulus internal remedies or local applications fail to check the spasm, intubation should be promptly done by O'Dwyer's method. The tube should be allowed to remain two or three days, when it is very likely to be coughed out. If not coughed out, it should be removed as soon as it is no longer needed. In patients living at a distance in whom the symptoms have already developed, where the physician may not be called in time to relieve a severe paroxysm, I would recommend intubation even before there was very serious obstruction of the larynx, for with the tube in position it is impossible for death to occur from spasm.

The profession is so familiar with intubation that there is no necessity for describing it, but I cannot too strongly urge upon physicians the importance of being able to do the operation.

NEURASTHENIA AND ITS TREATMENT.

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IN this paper the attempt will be made to state clearly the fundamental principles involved in the treatment of neurasthenic patients, as drawn from a knowledge of the nature of the disease and from clinical observation. More than this will obviously be impossible.

Neurasthenia may be classed as one of the degenerative neuroses of the nervous system, and especially of the brain; but it will be worth while, for the sake of knowing better with what we have to deal, to examine a little more closely into its clinical relations, its genesis, and its nature.

The neuroses have been called "functional" affections, and the term is a convenient one; but the time has passed when it is to be understood as implying that there is such a thing as a disorder of function which has no anatomical correlate.

The anatomical changes have been sought in (*a*) imperfect development of the nerve elements (Arndt), and (*b*) molecular or chemical peculiarities, leading to imperfect oxidation and nutritive failure, and due, in a general sense, to toxic influences.

It is, however, probable that the ultimate lesion is by no means always the same, and equally probable that the condition which it induces is not necessarily far removed from that of health. The neurasthenic patient generally belongs, it is true, to a neuropathic family, and sometimes shows stigmata of degeneration affecting other organs than the nervous system; yet closely analogous, if not identical, states may be developed by sickness and strain, by poisoning with lead and syphilis, by arterio-sclerosis, etc. The best nervous system has its limits of endurance, and demands certain conditions to enable it to work well; and, on the other hand, it cannot long work ill without the appearance of neurasthenic traits. The essential peculiarity of the disease is to be sought in a disturbance of the infinitely complex interaction of the nerve elements or nerve functions rather than in lesions of a constant

anatomical character. As the nervous system passes, in consequence of any one of many possible lesions, from a machine of superior order to one of inferior order, a continuous struggle for readjustment takes place, the peculiarities and results of which are fairly definite, as Hughlings Jackson in England and Charcot in France have clearly shown. On the one hand we see feeble, poorly-sustained, and irritable reactions, and, on the other hand, we see these reactions crystallizing into definite forms ("segmental" action, Royce), with the stamp of disease.

Thus arise, first, the simple "nervous" or "neuropathic" temperament and constitution, which is rather a tendency than a disease, and then neurasthenia, hysteria, hypochondriasis, and other serious neuroses and psychoses. A person may be called neurasthenic when his reactions are not only those of irritability and exhaustibility, but are such that more or less definite and complex groups of symptoms, of special orders (cardiac, digestive, ocular, sexual, vasomotor, psychical, etc.), reappear under slight provocation, and even apparently without provocation, and at somewhat regular intervals.

There is no sharp line of demarcation between the purely "nervous" and the "neurasthenic" states, but the symptomatology of the latter is far richer and more elaborate. This is in great measure due to the fact that the cerebral functions are far more deeply involved.

Not only do we find as a result of this a strong tendency to depression, mobility, impairment of attention and will, sense of impending danger, morbid self-consciousness, and the like, that sway or paralyze the thought and actions, but it is noticeable, and of high importance, that every failure on the part of the lower centres to do their duty efficiently is recognized, intensified, and made habitual. This may happen without the volition and almost without the knowledge of the patient, but the tendency constitutes, to my mind, the chief feature of the disease.

This principle may, it is true, be expressed in more general terms. There are nerve-arrangements of a high order of complexity lying between those which we ordinarily conceive of as related to the mental functions, strictly speaking, and those which provide for the simpler reflexes; and thus it may happen that when one of the simpler functions is primarily at fault, such as the cardiac or sexual, the disorder may spread so as to involve a variety of higher but related centres, without inducing mental symptoms to any considerable degree. It is thus that a distinction between "myelasthenia," and "cerebrasthenia" comes to be known. Nevertheless, it is perhaps rarely that the spread of the neurasthenic tendency long remains thus limited.

In this evolution of the so-called "functional" diseases, it is cer-

tainly in the brain, with its enormously complex machinery, that such disorders first occur. Clinicians have been slow to learn, but now fully recognize, that in hysteria, to say the least, a great number of phenomena previously considered to be of peripheral or spinal origin really have their root in morbid mental or cerebral action. But it must be remembered that the "mind," in this sense, includes not only the *habitual* consciousness, but all the cerebral activities of such high order that their outward manifestations bear the stamp of conscious, reflective acts (instructive, subconscious, somnambulistic, dream acts, etc.). In fact, the "mind," as the study of hypnotism and hysteria has clearly shown, is intimately related to the processes of secretion, digestion, vasomotor action, and even of nutrition.

The sound, robust man focusses all his powers upon the work in hand, and new obstacles only incite to new and more effective pleasurable effort. But in order that this should happen, innumerable associated cerebral processes must take place with exact promptness and efficiency. It is as if a thousand archers must shoot their arrows at a given signal through the ring. In the case of the neurasthenic this does not occur, and the result is not only an ineffective reaction but a *recognition* of failure, and thus a growing sense of distrust, suspicion, excitability, unreasonable desire, and a mental soil in which "auto-suggestions" of an unfavorable sort readily take root.

"Auto-suggestion" simply means that the higher cerebral processes, even those not immediately related to the habitual consciousness, are watchful for the events transpiring in the lower spheres of nerve-action, and are prone, if these are deranged, to make them the focus for elaborate morbid habits of complex sorts. They may do this in a misdirected attempt at a more stable readjustment, but the result in the case of the neurasthenic patient is apt to be disastrous from the social point of view.

Furthermore, these new and often insubordinate nerve-arrangements, or habits (segmental activities), are apt to become so important that they rival the habitual consciousness in dominating the action of the individual.

There are plenty of automatic processes going on in health, and many of them are of a very high order of complexity. But in health there is no material conflict between the subconscious states of mind and the habitual conscious states.

The healthy man can count on his instincts, and respects them as a part of himself; in the case of the hysteric or neurasthenic the conscious and subconscious states are often curiously at variance.

It is in consequence of the existence of these elaborate—often dominating, yet subconscious—mental states that the expressions are justified which nevertheless often cause much irritation, because misunderstood, it may be, by both speaker and hearer; as that a certain pain or disability exists only in a patient's imagination, or because of the attention he pays to it, and the like. This may be largely or wholly untrue of the habitual personality of the patient, but true of the subconscious personality. A good part of the work of the physician lies in the attempt to remove these recurrent or "habit" sensations and tendencies, or "association neuroses" (Morton Prince), of the subconscious personality; also the words or other influences which are addressed to the "habitual" consciousness or personality, often wholly and provokingly fail, as every one knows, to reach the subconscious states which are really responsible for the morbid conditions which it is desired to control, while a wholly different set of influences may have the wished-for effect.

This fact constitutes the opportunity of the charlatan, and points out the enlarged sphere of duty of the honest physician.

From infancy to age, in the cradle, at the school, and in the presence of the responsibilities of adult life, the individual with neurasthenic tendencies should be taught to bring into one harmonious hierarchy the varied functions of his nervous system. This is done not only by avoiding those contingencies which call out morbid reactions of a lower order, though this is of prime importance, especially in youth, but by learning to make the habitual consciousness supreme, to steel himself against the dominating influence of insubordinate morbid habits, and to annihilate these habits by the constant leaning to a better and higher order of interests.

A marked difference between neurasthenia and hysteria, looked at from the psychological point of view, is that the field of consciousness of the neurasthenic is not so narrow, but that he is able to recognize the imperfections of his cerebral action, while with the hysteric this is possible only to a much less degree (Janet), while with the hypochondriac, in so far as he is actually dominated by his delusions, it is impossible. The neurasthenic is thus an individual of higher type than either of the others, and though often a greater sufferer, yet is capable of making a greater advance towards health.

In approaching the treatment of a given case, we should, of course, strive to remove the causes of disease, both immediate and remote.

The suggestion that the disease often originates in an imperfect power of self-nutrition, on the part of nerve-cells, was utilized by

Pochl in his experiments with spermin, which was supposed to increase the oxidizing power of the cells. Under a somewhat similar idea, highly organized substances made of brain or spinal tissue have been injected into the circulation (cerebrine, etc.). The results in the hands of different observers have been by no means uniform, and it is reasonable to think that a large part of the success which has been obtained is due to "auto-suggestion" of improvement. To say the least, this would amply account for the results obtained. It would, however, be premature to deny the possibility that these or similar substances might exert a favorable and even specific action in special cases. But the fact that even neurasthenia, and still more hysteria, are sometimes associated with signs of impaired nutrition or development on the part of various other organs, besides the nervous system suggests that the substance which should effectively counteract the faulty tendencies must be one of subtle and far-reaching power. This has yet to be found, though the marvellous discoveries respecting myxœdema forbid us to deny the possibility of such an event.

By far the most important agents in the treatment of neurasthenia are those which utilize the patient's mind and regulate its action. Even where local treatment is of obvious utility, as in sexual or gastric forms of the disease, an essential part of the influence is the impression made on the subconscious personality of the patient, and the physician who succeeds exerts this influence, either consciously or unconsciously, at every moment. Before considering the principles here at stake let us glance at the more important treatments of other sorts, in the order of their importance.

HYDROTHERAPY.

The external use of water is a powerful means of raising the vitality of all the bodily functions, both through its action on the circulation and perhaps in subtler ways. Cold water is far more important than hot water for this purpose, but extreme cold is not well borne by neurasthenic patients *until they have been gradually taught to bear it*. This is due partly to the fact that the vasomotor reactions are not good; partly to the fact that a slight chilliness or shock suggests the idea of harm to the patient's subconscious personality, and initiates the evil consequences of instinctive dread. Here, as at every other step, the physician's influence may counteract the danger.

The best time for the bath is in the morning, or at noon, but it is mainly essential that the skin should be warm, even perspiring, and that the patient should not be exhausted. It has become almost a

routine treatment with me, in mild cases, to order a (short) brisk walk or other exercise, a rest with warm (blanket) covering, and a bath (of one or another kind, according to the case), to be taken before the noon-day meal. (See Barnd's Hand-Book.)

The splashing hip-bath, with douche to the back; the wet sheet; the pack, followed by cold wet sheet, or cold sponging, or cold douche; the alternating or cold douche under pressure are, when skilfully guarded and led up to, probably of distinctly more value than the use of electricity in raising the vasomotor tone (securing against vascular cramp and vascular dilatation) and improving the tissue metamorphosis. They share with electricity its immediately stimulating and refreshing action with the important sense of encouragement and mental invigoration. Local applications of water are also of great service in special cases, as in the treatment of imperfect digestion due to poor abdominal circulation, of spermatorrhoea with impotence, and the like.

In the former condition the abdominal wet pack of an hour's duration, followed by sponging with cold water, or even the alternating hot and cold douche, are often useful; in the latter, hot sitz-baths, the urethral or rectal rheophore, and also the alternating douche.

FOOD.

The metabolism of neurasthenic patients is often deficient, as shown by oxaluria, uraturia, and the like; and the stomach is apt to secrete an excess of hydrochloric acid, though sometimes the amount is insufficient.

The food-supply, therefore, should be simple, varied, well-cooked, and taken in smaller quantities than usual, and at shorter intervals, and, what is of special importance, not during times of fatigue.

It frequently happens that digestion goes on well enough, but is accompanied by a sense of distress, and this should not be allowed to give rise to morbid auto-suggestions of digestive incompetency.

Bad forms of neurasthenic indigestion may be excessively serious, and their treatment can hardly be considered in so short a paper as this. The essential points to remember are: that the actual processes of digestion are usually far less at fault than the symptoms might indicate, and that the chief element in the treatment is general management; absolute rest in bed at first, if need be, under an inflexible routine, with seclusion; and eventually determined demonstration that the patient can eat and can digest (Weir Mitchell).

It is often said that these cases are not suitable for gastric lavage ; but I have seen, as well as others, excellent results attend the occasional use of this method.

Electrical applications, external or internal, are also useful, though it is not improbable that the benefit is due partly to "suggestion" of improvement.

CLIMATE AND METEOROLOGICAL CONDITIONS.

Much has been written under these heads, but the main outcome is that neurasthenics suffer from extremes of heat and cold, especially the former, and largely for the reasons suggested under *hydrotherapy*. Even if no immediate bad effect is noted, exhausting after-reactions often occur. The same may be said of rapid changes and of high altitudes, and it is said that tendencies to cardiac irritability and to insomnia become intensified under the latter conditions.

ELECTRICITY.

There is no general agreement, among either scientific or practical observers, as to how electricity acts in modifying the nutrition of the nervous system, nor even whether it exerts any such action directly.

It is, however, certain that the great majority of the most successful physicians do find it useful in the treatment of neurasthenia, in one way or another, and it behooves us, therefore, to give the outcome of the best experience, and to find such explanations as we can. It is now held that electricity is the same under all forms, the differences between those used in medicine being expressible in terms of tension, quantity, and rapidity of the recurrence of shocks. Most of the effects of electricity in neurasthenia are doubtless secondary to its power of exciting the peripheral nerves in various ways. It has, indeed, been claimed both for galvanism, faradism, and franklinism that they do in some more direct way influence the nutrition of the tissues, but their good effects are often so immediate, occur so often in cases where the general nutrition is apparently but little at fault, that the analogy of the soothing and stimulating effects of warm and cold water at once suggests itself. Every good observer knows, further, that a soothing or stimulating application to the skin often means a similar influence exerted on the mind, and convertible into a sense of encouragement.

The most useful modes of using electricity have been : (1) the "general faradization" of Beard and Rockwell ; (2) galvanization of

the head and back ; (3) franklinization ; (4) the electric bath. Finally, electricity is largely used for special purposes with neurasthenic patients. Distressing sensations in the head, gastric disorders and constipation, cardiac irritability, sexual weaknesses, asthenopia, etc., have all been successfully treated in this way. But the physician who undertakes this method must give himself a special training, or he is likely to fail.

MEDICINE—TONICS.

By far the most useful of these agents, in my opinion, is strychnine in full doses, and the best form in which to use it is tincture of nux vomica, increased gradually from a small to a larger dose by a regular daily addition. This is in part because the danger of oversudden stimulation is avoided ; partly, perhaps, because the patient's expectant attention is aroused and slight signs of improvement quickly noted.

Iron may occasionally be useful, even in large doses, but it is a striking fact that, as a rule, the exact blood-tests indicate no marked anæmia, even when the patient looks pale, and there is reason to believe that the aggregate quantity of blood is low. Arsenic is said to improve the vasomotor tone ; and if this is true, it should be of great service, but I have not myself seen any striking results from its use.

A recent observer, commenting on the signs of slight arterio-sclerosis, which he thinks sometimes is the cause of neurasthenia (increased blood-tension, though with feeble pulse, has been repeatedly noted), asserts that he has found the remedies which lessen the blood-tension to be of noticeable service. I have no experience bearing on this point, and have not seen the serious results of arterio-sclerosis among neurasthenics, but the question may repay further study.

Stimulants and narcotics are in general to be avoided, so far as their tonic effect is concerned, but they sometimes bridge over an important interval or crisis, and in that way are very useful. Patients are often really very sensitive to these substances, and often believe that they are more sensitive than they are.

If they are intelligent enough to recognize this, and to assist in overcoming the tendency, it is a step in advance that they should learn to do so.

The occasional use of bromides for a few days is of great service, and it might be well for American physicians to employ piscidia as an occasional substitute, as it is praised by some of our foreign colleagues.

REST AND EXERCISE.

The indications to be followed under these heads are too obvious to require much comment in so short a paper. The neurasthenic who can take exercise freely has a resource of immense value, and there would be more such than there are were it not that the occasional and inevitable fatigues induce the haunting dread of harm to result. It is a fortunate day for such patients when they learn that fatigue and pain are not their lot alone, but are the condition of successful work, and that even if they are more susceptible than the more robust, they can grow stronger and more enduring, instead of weaker, under fatigues patiently borne and soon forgotten.

PSYCHICAL TREATMENT.

This is, as has been said, the essential part of our subject, for not only are the mental symptoms—the irritability, despondency, paralyzing sense of incapacity, etc.—the hardest to bear of any, but the half-recognized anticipation of further mischief intensifies every actual mischance.

Only the principles which are at stake can be considered here, and these may be ranged under (1) the headings of the training of the patient's conscious volition, and (2) training of his subconscious mental forces.

If it is important that the healthy and normal individual should exert himself to live on a high plane of self-control and impersonal devotion to appropriate aims, it is almost essential that the neurasthenic should do so, if only for the sake of raising himself out of the slough of self-consciousness and invalidism. Sir Philip Sidney says, "I have learned from experience that I am never less a prey to melancholy than when I am earnestly applying the feeble powers of my mind to some high and difficult subject," and the sentiment will be re-echoed by many a person more in need of its influence. For success in this direction, the patient must generally be willing to change his temperament and habits of mind in many respects, and the physician must either have the gift of inspiring him by his mere personality, or must be a strong advocate for high ethical standards and methods.

The neurasthenic invalid is apt to indulge himself in thinking and talking about his troubles, in yielding to his moods, and in the expectation of being humored,—not only because he cannot well help it, or from love of attracting attention, but also because he secures a real, though but temporary, relief thereby.

It is for this reason, in part, that the demand to change his disposition and habits involves a considerable sacrifice.

It cannot, indeed, be asked that the bow of self-control should be bent to the point of breaking; but if, on the other hand, the sacrifice of momentary relief is persistently made, and the value of the new order of things clearly recognized, it will be seen that a material step towards health has been made.

Any improvement which comes in this way through the patient's conscious volition is of the best and most permanent sort; but a more rapid and usually more effective gain is obtained by methods which do not really appeal strongly to the patient's intelligence (though they often seem to do so), but which regulate his subconscious mental acts, and set in operation a new set of dominant and favorable influences. Such influences are given by the "suggestive" therapeutics of which one hears so much, and of which hypnotic suggestion is but the last expression.

The use of one or another method of this sort is as old as humanity, and will endure as long; and it is idle and ignorant to scold against hypnotism, as has been done in so many quarters, especially by some of the English journals, and to gloat over every failure that happens in its name, instead of recognizing that it has thrown much new light on an old but enormously important subject. It is ignorance of the real nature and use of suggestive therapeutics on the part of the profession—well versed in pathological anatomy, but poorly versed in psychology—that throws so many patients into the hands of irregular practitioners.

The first requisite for success by this method is that the patient should be made to lay aside his critical volition, in so far as it is incompetent to help and is prone to hinder the work of instilling new and effective impulses leading to encouragement, hopefulness, the minimizing of obstacles, and the withdrawal of attention from morbid ideas by the substitution of ideas of health. Given a non-critical, "suggestible" mood such as this, which may be secured either by hypnotism or by persistent treatment of one or another sort, such as hydrotherapeutics or prolonged applications of static electricity, especially if they are momentarily agreeable or stimulating, and the suggestions of improvement and encouragement will almost make themselves, or will be given by the determined and hopeful attitude of the physician, independently of his words.

The essential thing is, then, that each patient should be persistently and vigorously treated by the means which are in themselves the

most useful, which secure for the patient a temporary sense of refreshment and relief, and which are associated in his mind with conscious or unconscious memories of an attitude of determined hopefulness on the part of the physician.

During such treatment the patient's conscious attention and volition must be either in abeyance or else in a favorable attitude, which the physician should take special pains to induce and encourage.

If the patient is in a debilitated state, the use of the so-called "rest-cure," as devised by Weir Mitchell, will fulfil these indications; if he is not greatly debilitated, a carefully systematized course of treatment by rest and exercise, of which the details are managed by a tactful nurse, is very useful. If this is impracticable or unnecessary, a hydropathic or electrical treatment—and as regards the latter I have myself found the static electricity the most available—fills an excellent place.

The whole treatment must be animated by the personal influence of the physician, and with not only the temporary but the permanent welfare of the patient in view; and not only his welfare as a vegetating animal, but as an active and useful member of society.

Hypnotism is, in some respects, only the final and most effective expression of this sort of treatment,—a speedier and more thorough way of introducing a new order of effective impulses deep into the patient's mind; of counteracting unfavorable, dominating states of mind of which the patient cannot rid himself alone, because they have their roots in regions of neural action over which his consciousness has not learned to have sway.

The good to be got from hypnotism is measured by the physician's skill and aptitude, but is considerable even for neurasthenic patients, though they are proverbially hard to hypnotize: the harm which sometimes attends this treatment can be avoided by knowledge and painstaking.

Although, however, hypnotic suggestion is sometimes of great service, it is usually not absolutely essential, and most physicians probably do better to cultivate the methods not requiring the special aptitude and skill which are requisite for that purpose. The main thing is that each physician should treat his patients thoroughly, sympathetically, firmly, with a correct understanding of their diseases, with devotion to their interests, and without being niggardly of his own efforts.

Neurasthenics must live at a lower rate, and with more precautions, than healthy persons, and they should be taught to make their sacri-

fices cheerfully, and not to consider themselves as invalids, but rather as normal individuals with certain limitations.

The *treatment of special forms and symptoms of neurasthenia* could be considered here to advantage if space permitted.

I can, however, only pause to call attention to the great value of Weir Mitchell's rest-treatment, thoroughly applied, in cases of great debility, but rarely otherwise except for brief periods; to the usefulness of sending convalescent patients to the country with a skilled nurse; to the great importance of Dyer's method of training the eye-muscles (really a training of the subconscious mental processes) in asthenopia.

The great subject of sexual neurasthenia cannot be treated in brief (though its principles have been touched upon), and the reader is referred to the works of Krafft-Ebing, and of Schrenck-Notzing for fuller details.

I would also express warm sympathy with the strong plea made by Krafft-Ebing for more sanitariums for neurasthenic patients, conducted on as simple and economical a plan as should be compatible with efficiency. Competent and energetic physicians and abundant means for securing opportunities for healthful labor would be the main requirements.

Medicine.

SECONDARY ANÆMIA.

CLINICAL LECTURE DELIVERED AT THE UNIVERSITY OF VIENNA.¹

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Physician to his Royal Highness Prince Ferdinand of Bulgaria.

GENTLEMEN,—Starting out with the assumption that the sympathetic is the trophic nerve for the epithelial cells, and that the blood-corpuscles likewise represent epithelial structures (Rabl's theory), Professor Neusser² advanced the following theory in regard to the eosinophile cells. He states that their origin is dependent upon the degree of irritation of the sympathetic nerve, just as the muscular fibre, as a cell, is dependent upon the function of the motor nerve supplying it, and just as the Pacchionian body represents the end-plate of the sensory nerve. In this sense the blood-cell may be looked upon as the element produced by special organs, which, in turn, are controlled by the sympathetic nerve. The similarity in the action of the salivary glands on irritation of their sympathetic nerve-fibres offers a support of this supposition. The abundant multicellular saliva, which is produced by the gland after irritation of the sympathetic nerve, is positive proof that the production of cells may be influenced by nervous stimulation. This theory may be of service in arriving at a proper understanding of those diseases in whose course the morphological changes of the blood are related to the eosinophile cells.

As to the origin of the red blood-corpuscles in general, especially, however, in regard to the transitional forms (*übergangs formen*), from which, finally, after disappearance of the nuclei, arise the blood-disks of the more highly developed beings, we find different views among different authors.

Bizzozero³ proved that in birds the red blood-corpuscles are, so to speak, generated in blood-glands in the marrow of the bones; for he

¹ Translated by Dr. Henry Hartung, Chicago.

² Neusser, *Klinisch. haemat. Mittheilungen*, *Wiener klinische Wochenschrift*, 1892.

³ *Neue Untersuchungen über den Bau des Knochenmarks bei den Vögeln*, *Archiv f. mikroskop. Anatomie*, Bd. xxxv.

found in the marrow of birds' bones, after considerable loss of blood, the mitosis of the erythrocytes greatly increased. Loewit¹ also represents the erythrocytes as developing in a different manner from the leucocytes. The former multiply by means of mitosis; these Loewit calls erythroblasts. In the nuclei of the white corpuscles (leucocytes) the division takes place, according to Loewit, in a different manner,—namely, by “*divisio per granula*.” This different behavior on the part of the nucleus in erythroblasts and leucocytes varies, according to this author, with the chemically dissimilar forms of albumen which constitute the nucleus.

A third group of investigators—Müller,² Wertheim,³ and others—find, in the blood of the embryo, cells from which red or white blood-corpuscles arise, according as their protoplasm does or does not absorb hæmoglobin. The nucleus of these embryonal cells divides by the process of mitosis.

We find the nucleated red disks in the circulating blood of all inferior animal forms; in reptiles and amphibians they are also found in the fully developed; in the higher classes of mammals, on the contrary, they are found only during the time of their embryonal state, sometimes also in the newly-born. In the blood of the very young animals Howell⁴ found two forms of transitional structures. The first of these attain the size of the red cells found in the blood of the fully-developed mammals. In the greater number of these cells he found nuclei centrally located.

The second kind of cells resemble the red blood-corpuscles of the reptilia and amphibia; they are considerably larger than those already mentioned. They are oval, and their nuclei stain deeply. Howell makes use of this fact in support of the theory of atavism. Finding in the blood of mammals, especially during their embryonal lives, those nucleated blood-disks which are regularly met with in the lower forms of animals, he speaks of them as “*ancestral form corpuscles*.”

Hayem,⁵ in his monograph on blood, likewise distinguishes two forms of nucleated blood-disks. The one kind is considerably larger

¹ Loewit, Ueber Neubildung und Zerfall weisser Blutkörperchen, Ein Beitrag zur Lehre von der Leukaemie, Sitzungsbericht d. Akad. d. Wissensch., Wien, Bd. xcii., 4te Abt., 1885.

² H. F. Müller, Zur Leukaemie-Frage, Deutsche Archiv f. klinische Medicin, Bd. xlviii., 1891.

³ Wertheim, Zur Frage der Blutbildung, Zeitschrift für Heilkunde, 1891.

⁴ The Life-History of the Formed Elements of the Blood, especially the Red Blood-Corpuscles, Journ. of Morphol., vol. iv., 1890.

⁵ Hayem, Du Sang, Masson, Paris, 1889.

than the other, having a diameter of 0.02 millimetre. In these structures Hayem found one or two centrally-located nuclei; in human embryos they may be easily found in any of the earlier stages. Hayem calls them "globules nucleos grandes." They correspond to Ehrlich's megaloblasts.¹ In the more advanced periods of life similar blood-corpuscles appear as a symptom of pernicious anæmia. Ehrlich and Rindfleisch² regard these as pathognomonic of the disease mentioned.

The second kind of nucleated erythrocytes, "globules nucleos de taille moyenne," the monoblasts of Ehrlich, do not differ in regard to size from the red corpuscles of the normal blood; they are also found in the marrow of the bones, in addition to the megaloblasts, during the first months of embryonal development. The megaloblasts disappear during the last months shortly before birth, while the type of nucleated red corpuscles above mentioned remains unchanged in the blood, as well as in the bone-marrow. Examinations of the blood of newly-born infants have proved the existence of this kind of nucleated cells even as early as a few days after birth (Voino-Oransky).³

These nucleated red blood-corpuscles appear most frequently in lymphatic and spleno-myelogenic leukæmia, in chlorosis, and in some diseases which lead to severe forms of secondary anæmia.

While, especially during the last year, considerable attention has been paid to the changes in the blood of primary anæmia, the study of secondary anæmia produced by different diseases is still comparatively new.

I shall endeavor, therefore, to-day to more closely define such phases of the blood, and will begin with the changes appearing after extraordinary hemorrhages (anæmia post-hæmorrhagica).

Shortly after the loss of about one-third of the circulating blood (*e.g.*, after three hours), the quantity of blood lost will be made up by means of stimulated endosmosis from the various tissues into the arterial system. Owing to this, there arises hydræmia, the original quantity being restored; the number of red blood-corpuscles, however, decreases in proportion to the amount of blood lost.

In from two to seven days after this hemorrhage a series of

¹ Ehrlich, Ueberschwere anaem. Zustände, Verhandlung d. XI. Kongress f. innere Medicin.

² Rindfleisch, Ueber den Fehler der Blutkörperchen-Bildung bei progress. Anæmie, Virchow's Archiv, 1890. H. F. Müller, Ueber die atypische Blutbildung bei der progress. Anæmie, Deutsche Archiv f. klin. Med., 1892.

³ Voino-Oransky, Zur Frage der Morphologie des Blutes bei Neugeborenen, Dissertat. Russ., Petersburg, 1892.

changes takes place. The amount of hæmoglobin of the individual corpuscles is greatly decreased, while the number of hæmatoblasts is increased; at the same time an increase of fibrin is noticed in specimens prepared according to Hayem's method.¹ In addition to this, nucleated red blood-corpuscles will appear in greater or less numbers (Ehrlich's normoblasts).

After the seventh day the number of blood-cells increases very rapidly; the amount of hæmoglobin, on the contrary, does not correspond to the number of corpuscles, so that their power of absorbing colors (Färbe-index) is less than normal. Consequently, about two or three weeks after a considerable loss of blood, we obtain a similar microscopical picture of the vital fluid as in chlorosis, remembering that each newly-formed blood-cell contains less coloring matter than a fully-developed one. This deficiency of hæmoglobin of the undeveloped cell is characteristic of the morphological change of the blood in chlorosis, and also in cases of great hemorrhages. In spite of this, there are certain differences in the morphology of these two forms of anæmia, the knowledge of which may be of value to the physician in those cases where hemorrhages appear simultaneously with primary chlorosis (chlorosis menorrhagica, endometritis menorrhagica). Here the consideration of the etiological factors may serve as a guide in regard to the therapeutics,—namely, whether the primary anæmia or the secondary hemorrhage shall be the object of treatment. If, therefore, after such a loss of blood an increase of fibrin is noticed, and also a marked increase of the blood-plates of Bizzozero can be ascertained, then in difficult cases this fact of *itself* may show that, contrary to the primary forms of chlorosis, anæmia is a direct result of the sustained loss of blood, and that the blood-producing organs display great activity, evidently an expression of nature's great reparative processes.

Four or five weeks after extensive hemorrhages, provided the case progresses without further complications, the blood returns to the normal condition.

Two cases of typhoid fever may serve to illustrate in how far the recognition of these secondary changes may be of value in the diagnosis, as well as in the prognosis, of this disease.

From other infectious diseases typhoid fever may be distinguished by a diminution of the number of leucocytes, which fact has been repeatedly observed by different authors² as a never-failing symptom.

¹ Hayem, as cited.

² V. Limbeck, *Klinisches und Experimentelles über die entzündliche Leucocy-*

In six out of twenty-eight cases of typhoid I was convinced that the appearance of leucocytosis was of the nature of a complication, and that from this point of view it must influence the prognosis, being the result of a primary or secondary mixed infection.

In the first case to be mentioned the microscopical examination revealed the typical picture of the typhoid blood. In one cubic millimetre the number of red blood-corpuscles was 4,200,000; of leucocytes, 2600; the amount of hæmoglobin, according to Fleischl, seventy-five to eighty per cent. Of the leucocytes, fifty-eight per cent. were lymphocytes (their relation in the normal blood is about thirty-two per cent. of the entire number of leucocytes).

At the end of the third week the following clinical symptoms—*e.g.*, marked pallor of the face, rapid pulse, feeling of great weakness, also a sudden drop of temperature—indicated a complication in the form of an intestinal hemorrhage, which, however, could not be conclusively diagnosed on account of continual constipation.

The examination of the blood in this case helped us to arrive at a correct diagnosis. The number of erythrocytes was 2,400,000; the leucocytes, 3200 per cubic millimetre; the amount of hæmoglobin between forty and forty-five per cent. In almost every single microscopical field nucleated red blood-disks could be seen; also an extensive net of fibrin surrounding the blood-plates of Bizzozero. All this, however, was indicative of a most unfavorable prognosis; for, judging from the hæmatological picture, the loss of blood must have been very great. A fatal result occurred at midnight of the twenty-sixth day of the disease.

The second case was also one of typhoid fever, which at the climax of the disease was complicated by an intestinal hemorrhage. In this case the secondary decrease of the erythrocytes was of little significance. The examination prior to the loss of blood showed 4,500,000 red and 5000 white blood-corpuscles to the cubic millimetre; hæmoglobin (Fleischl), eighty per cent. There was a total absence of eosinophile cells, and very few of the blood-plates of Bizzozero were noticeable; no increase in the amount of fibrin. After the intestinal hemorrhage, investigation showed 3,800,000 erythrocytes and 6000 leucocytes to the cubic millimetre; there were no great changes in

tose, *Zeitschrift f. Heilkunde*, x., 1889. Halla, Ueber den Haemoglobingehalt des Blutes, etc., bei acutem Fieber, *Zeitschrift für Heilkunde*, iv., 1888. Rieder, Beiträge zur Kenntniss d. Leucocytose, Leipzig, 1892. Fernas, Ueber die Schwankungen der Blutkörperchenzahl im Verlaufe einiger Infections-Krankh., *Deutsch. Archiv für klin. Medicin*, xli., 1887. Psé, Untersuch. über Leucocytose, Dissertat., Berlin, 1893.

the number of hæmatoblasts nor in the amount of fibrin. Not until a few days afterwards did the hæmatoblasts and the fibrin increase. Nucleated red blood-corpuscles could not be found, nor did they appear in the days following. From this we concluded that there was only a slight hemorrhage, which assumption probably was correct, as the patient soon recovered.

It is a well-known fact that it is very difficult to exactly determine the amount of blood lost during an intestinal hemorrhage in typhoid fever. This complication in itself is rather alarming, and becomes more so when it appears in patients already run down by the infection and fever. A constitution comparatively less affected can readily reproduce the amount of blood lost. However, if the patient's power of resistance has been greatly diminished, then it is easy to infer that the loss of energy caused by the process of reproduction of the blood may result disastrously to the patient, as was proven in the aforementioned case, the patient dying shortly after the hemorrhage.

As another cause of secondary anæmia, we must consider the changes brought about by the introduction of various poisons into the system. I shall confine myself to the consideration of only such poisons as are of importance to the medical practitioner. Such poisons may be introduced into the body by means of the respiratory or intestinal tract. The representative poison to the respiratory organs, the carbon monoxide, which soon after inhalation causes either immediate death or serious illness, differs from other less dangerous poisons in so far as it does not produce morphological changes in the blood which are noticeable under the microscope. Apparently only chemical changes take place, which consist of the expulsion of the oxygen from the oxyhæmoglobin and the union of the carbon monoxide with the hæmoglobin, no change in the *structure* of the red blood-corpuscles resulting therefrom.

Those poisons, on the contrary, which transform the oxyhæmoglobin into a simple hæmoglobin are characterized by morphological changes occurring at the same time with chemical ones (Kobert).¹ Such changes can be made visible by means of a micro-chemical reaction, which depends upon the quality of the normal hæmoglobin—the reduced as well as the oxyhæmoglobin—to stain only with acid stains, while, on the contrary, in cases of poisoning with poisons of the kind before mentioned, a part of the red blood-disks stain only

¹ Kobert, Lehrbuch der Intoxicationen, 1898. Further: Wyss, Ueber Blutgifte, Correspondenzblatt d. Schweizer Aerzte, 1898.

with basic stains; polychromatophobia asserts itself in a high degree. In addition to this, Heinz—who made experiments with poisons of this kind—found within the red blood-corpuscles, centrally located, minute bodies which absorb acid stains to a large extent (Ehrlich's hæmoglobinhaltige Innenkörperchen).¹ The peripheral parts of the protoplasm of the erythrocytes absorb only a little coloring matter (Ponfik's blood-shades).

Three or four days after the introduction of the poison into the system the number of red blood-corpuscles begins to decrease. After a single dose of 0.4 of a grain of benzol (Huber²) the number of erythrocytes in rabbits is lessened in a very characteristic way. Examination before the experiment showed 5,588,000 red blood-corpuscles in the cubic millimetre; on the following day, 4,860,000; on the third day the decrease was very marked, they numbering only 1,004,000. At the same time the spectrum of methæmoglobin appeared not only in the blood, but also in the urine. In a similar way as by this poison the blood will be influenced by other poisons³ belonging to the same group, as pyrogallol and pyrocin.

In the clinic of Professor Neusser I had the opportunity of observing a case of poisoning with kalichloricum, a patient, nineteen years of age, taking six grammes of this poison with suicidal intent. The stomach was pumped out two hours afterwards. Examinations of the blood were made twice daily, but disclosed nothing abnormal until the fourth day, when numerous nucleated red blood-cells appeared. This was the more surprising as repeated countings, according to the method of Thoma-Zeiss, showed no decrease of the number of erythrocytes.

Similar effects are noticeable in cases of arsenic-poisoning, nucleated red cells appearing constantly. A different condition of the blood is met with in patients suffering from chronic lead-poisoning. Malassez called attention to the appearance of extraordinary large erythrocytes stained intensely with hæmoglobin, considering them of great pathological importance. In two serious cases of chronic lead-intoxication I found a large number of nucleated red cells.

¹ Ehrlich, as cited, *Die Fälle von Dinitrobenzolvergiftung*.

² Huber, *Virchow's Archiv*, Bd. cxxvi., 1892. Compare Filehne: *Ueber die Giftwirkung des Nitrobenzols*. *Archiv für exper. Path. und Pharmac.*, Bd. ix., 1878. Kohl: *Ueber akute und chron. Intoxic. durch Nitrokörper der Benzolreihe*, Rostock-Dissertat., 1890.

³ Albertoni: *Ueber Blutbildungsprozesse unter dem Einfluss von Pyrocin*, *Archiv für die gesammte Physiolog*, Bd. xi., 1891.

It is a remarkable fact that the appearance of nucleated red corpuscles does not always correspond to the other morphological changes of the erythrocytes; as, for instance, with the appearance of macrocytæmia and microcytæmia. *The presence of nucleated red corpuscles may be a phenomenon entirely independent of anæmia*; therefore they cannot be looked upon as a mere result of the reaction of the blood-creating organs in consequence of an existing anæmia.

The fact that the nucleated red blood-corpuscles appear after poisoning may be of great importance to the physician in cases of a forensic nature not only, but also in those cases of anæmia in which poisoning takes place in the form of an auto-intoxication; their appearance must be of interest to the physician, as well as to the pathologist, as one of the effects due to some form of intoxication.

According to our view, there appears in patients suffering from cancer an early anæmia which is not in proportion to the size of the malignant growth. This anæmia may be looked upon as a result of the intoxication of the system by the specific products of cancer, called "cancer cachexia" by the physicians of the old school. It is a fact that anæmia and cachexia are independent of the size of the neoplasm, and, indeed, in the lesser carcinomata of the ductus cysticus, which scarcely attain the size of a hazel-nut, also in certain forms of medullary cancers, we meet with a much-advanced marasmus. On the other hand, we often fail to see this cachexia and anæmia in cases of large carcinomata, and in such as lead up to numerous metastatic infiltrations in other organs; for instance, in scirrhus. From my experience I am prone to believe that the difference in the findings of the blood may be of value in differentiating these two forms of cancer.

Aside from these changes, another characteristic symptom is peculiar to the blood of carcinomatous patients. Hayem has, as is well known, called attention to the leucocytosis in the blood of such patients, the same condition existing quite often, also, in other malignant neoplasms. In one case of cancer of the thyroid gland, Hayem¹ counted 70,000 leucocytes in one cubic millimetre; in a case of cancer of the kidney, described by Limbeck,² which led to abundant metastases, the number of leucocytes amounted to 80,514 in the cubic millimetre.

In the clinic of Professor Neusser I had occasion to observe an interesting condition of the blood in a patient suffering from cancer of the pancreas with subsequent metastasis. The very marked leucocy-

¹ Hayem, as cited.

² V. Limbeck, Grundriss einer klinischer Pathologie des Blutes, Jena, 1892.

tosis of neutrophiles, the presence of nucleated red blood-corpuscles, at times exceedingly abundant, further, the increase in the number of eosinophile cells, made the blood appear similar to that of leukæmia. To complete this, only the myelocytes and the cells of Cornet were lacking. The nucleated erythrocytes were unusually numerous, while those changes which are characteristic of oligocythæmia were wanting.

In carcinoma we encounter the most varied stages of anæmia; the decrease of the red blood-corpuscles sometimes may reach the limit set for pernicious anæmia (Eisenlohr).¹ In such serious forms of secondary anæmia the action on the part of the nucleus of the red cells is worthy of notice. It is broken up (karyolysis), and its parts may be found scattered in the protoplasm of the cell, where they may remain for some time, lying close together. They then resemble a clover-leaf or a sarcina of the stomach.

Post mortem characteristic changes are also found in the marrow of the bone, which then appears red, and under the microscope reveals quite a number of nucleated red cells, likewise bearing evidence of this peculiar breaking up of the nuclei.

No less remarkable are the changes in the blood accompanying suppuration. In regard to the etiology, we distinguish between different forms of suppuration,—whether we have to deal with specific micro-organisms producing clearly-defined clinical forms of disease, or with essentially pus-producing organisms. To the first group belong the diplococci, bacilli coli, typhi, etc.; to the second the staphylococci and streptococci. Furthermore, it is well known that the pyogenic micro-organisms, according to the degree of their virulence and in spite of the similarity of etiological factors, in their clinical course may give rise to different forms of suppurative diseases. Corresponding to the hæmatological changes that are noticeable in these different processes, we may derive ideas as to the pus-producing organisms, and also as to their degree of virulence.

Discovering in the blood an increased amount of fibrin, besides a marked febrile leucocytosis of neutrophile granulations, we may with great probability assume that the fever was caused by an infection with diplococci. Furthermore, we are able to distinguish in suppurative processes two different aspects of blood. First, if the suppurative process begins to develop in the subcutaneous tissue and does not spread or proceed into the lymphatic vessels, then the diseased condition is confined to the nearest lymphatic glands. In such cases we observe but a slight

¹ Eisenlohr, Deutsches Archiv für klin. Med., Bd. xx., p. 505.

decrease in the number of the red blood-corpuscles, and a minimum increase of fibrin and of the number of hæmatoblasts; the leucocytes, however, become greatly increased, and at the same time their numerical relation to each other is altered.

Eosinophile cells are either not found at all or are found in very small numbers (one eosinophile to twelve hundred leucocytes in one case). The leucocytes with neutrophile granulations, however, are exceedingly numerous; in some cases of suppurative fever we find them increased to eighty per cent., sometimes even to ninety-five per cent., the normal amount being about sixty-nine per cent. of all white blood-corpuscles.

In the same proportion as secondary centres of suppuration appear in other organs, the findings in the blood will vary; all the above-named changes become more pronounced, and unite to prove that in such cases we have to deal with genuine pyæmia.

In cases of disease caused by the same micro-organisms, especially in such cases where the great virulence of the products of the infection is shown in the clinical aspect of hemorrhagic septicæmia, we meet with changes in the blood which differ greatly from those above mentioned. Suppuration in the wound itself is rarely found; secondary foci of suppuration are likewise wanting; but we here have to deal with a general infection of the entire system, which is dependent upon the malign influence of the toxalbumin produced by the micro-organisms.

Correspondingly marked changes are noticeable in the microscopical picture of the blood. Soon after the beginning of the fever we encounter a considerable decrease in the number of erythrocytes, which sink to 2,400,000 and even less in the cubic millimetre; at the same time great morphological changes take place, and the percentage of hæmoglobin is lowered enormously (thirty to thirty-five per cent., Fleischl). In several cases I also found nucleated red blood-corpuscles. These changes deserve more consideration, because in other infectious diseases, as typhus, tuberculosis, etc., we find no marked changes either in number or in the morphological aspect of the erythrocytes. In contrast to other infectious diseases, the eosinophile cells do not disappear, and usually a pronounced febrile leucocytosis is absent in such cases of suppurative fever.

Aside from these forms of secondary anæmia, dwelt upon rather minutely for the sake of their clinical value, we find symptomatic anæmia in cases of intestinal parasites, especially in *anchylostomum duodenale*, where the toxine produced by the parasite is the probable cause of the anæmia.

It was my good fortune to observe a case of this kind in the clinic of Professor Neusser, which was characterized by the following changes in the blood :

Red blood-corpuscles, 2,700,000 per cubic millimetre.

Amount of hæmoglobin (Fleischl's method), twenty per cent.

The coloring index of the individual erythrocyte, 0.44 ; besides, a large number of nucleated red blood-cells could be made out. It was interesting to notice, also, that the eosinophile cells amounted to sixteen per cent. of all leucocytes, instead of one to two per cent. in the normal blood, such an increase having been repeatedly noticed by different authors.

The numerical increase of these cells, as well as the appearance of nucleated red blood-corpuscles, for both of which the marrow of the bone has been assumed to be the origin, may be considered as the result of the reaction of the anæmia on the marrow, the more so as the patient complained of pain in the joints and bones.

In other cases there may be found an increase in the number of eosinophiles, without a contemporaneous appearance of nucleated red cells and without pronounced anæmia, as was observed by Professor Neusser in those cases of pellagra in which changes in the skin were hardly noticeable, so that a transmigration of the eosinophiles from their local seat in the skin was difficult of conceiving. In all these cases of pellagra he found a considerable number of eosinophile cells in the stools. The cases of *anchylostomum duodenale* are also characterized by the appearance of numerous Charcot-Leyden's crystals in the fæces, as was observed by Leuchtenstern.

This fact on the one hand, and the increase of eosinophiles in the blood on the other, remind one of the close relation existing between Charcot-Leyden's crystals and eosinophile leucocytes. Such a coincidence makes it probable that the increase of eosinophiles in cases of *anchylostomum duodenale* and in similar intestinal parasites is an independent symptom, having no relation to the degree of anæmia, and controlled entirely by the primary cause of the disease.

All these explanations of secondary forms of anæmia pursue the object of proving that the hæmatological pictures in the above-named diseases present various aspects in regard to the quality and quantity of the erythrocytes, as well as of the leucocytes ; that, on the other hand, there are some hæmatological findings exactly resembling certain kinds of pathological conditions (such as chlorosis and pernicious anæmia) which appear in cases that etiologically have nothing or very little in common ; at most, this peculiarity, that they have an irritative

or destructive influence on the blood-forming organs. From this we may conclude that the discovery of morphological changes in the blood is of similar clinical value as the establishing of the existence of albuminuria or icterus as a symptom of a disease; which symptom, however, gains more absolute diagnostic importance in the further examination of the patient. In many cases the careful study of the blood not only completes the clinical symptomatology, but in complicated cases may become the deciding factor in regard to the diagnosis and prognosis of a disease.

CIRCUMSCRIBED SUBDIAPHRAGMATIC PERITONITIS.

CLINICAL LECTURE DELIVERED AT THE PARIS MEDICAL SCHOOL.

BY PROFESSOR POTAIN,

Professor of the Practice of Medicine in the Faculty of Medicine of Paris.

GENTLEMEN,—Several days ago a patient of robust appearance, twenty-eight years old, presented himself at our clinic. No previous malady had been noted in his history, with the exception of an attack of typhoid fever, which occurred three years ago. Since then the patient has never experienced any dyspeptic trouble,—at least, so he affirms, and, as there is absolutely no reason for dissimulation, we must suppose that it is true that there has been no digestive disturbance. You will understand the importance of this point when I give you his history.

Four days before he came to the hospital, this patient, who had never experienced any abdominal pain nor been subject to constipation, became suddenly constipated. This constipation was complete: not only was the faecal matter not evacuated, but even the gases did not pass off. On May 12 violent vomiting set in, and he entered the hospital. It was found that his temperature was 39° C.; the abdomen was distended and sensitive, particularly in the region of the right hypochondria on the level of the right edge of the rectus muscle, where the pain was intense. The diaphragmatic respiration was entirely absent: during the expiratory act the abdomen collapsed, which proved that the diaphragm was motionless. The limits of the liver were normal; auscultation revealed nothing unusual; the urine was slightly albuminous.

The case was evidently one of peritonitis, the diagnosis not presenting the slightest shade of doubt. The peritonitis was limited to the upper portion of the peritoneum, but what was the primary cause of the affection? The first thought that presented itself was that of intestinal obstruction, on account of the constipation and the vomiting,

but this hypothesis had to be abandoned, because the enema administered to the patient immediately after his arrival at the hospital resulted in the evacuation of faecal matter. On the other hand, there did not appear to be any unusually distended intestinal loops, which are generally met with in cases where there is obstruction. The particular point at which the pain was much more intense than in the remainder of the abdominal cavity corresponded with the region of the gall-bladder, and might have led one to suppose the existence of a calculus of that viscus. There was no more reason, however, for biliary symptoms than for intestinal disturbances, but—a fact of some importance—calculi may be present for a long time without giving rise to any trouble. Cases of this kind have been published, and I have had under observation a case which had been diagnosed as one of cancer of the stomach, and in which I diagnosed a calculus which had given rise to peritonitis. The patient succumbed, and the autopsy proved the correctness of my opinion. However, a calculus may be the primary cause of peritonitis without having previously given rise to ulceration. Owing to the presence of a slight icterus, and in view of the other symptoms I have cited, it was supposed that there was a calculus. This diagnosis was certainly carefully evolved; nevertheless, as you will see, it was not the correct one. In medicine it often happens that a diagnosis is based on undeniable reasons, and yet one may be mistaken. But to return to the history of this patient. I have already told you that on his entrance into the hospital an enema was administered, which resulted in a copious evacuation. The following day the fever had diminished to 37.6 C., the abdomen was much less painful and the hepatic dulness evident; the patient felt much better, but the vomiting persisted notwithstanding the general amelioration, and another symptom presented itself,—hicough. On the 16th the vomiting ceased, but the hicough persisted. The continuation of this symptom gave me great anxiety. The case was evidently a serious one, and I began to consider the advisability of resorting to surgical interference. This was a very delicate question. In cases of peritonitis the results of surgical procedures are not very reassuring; the point to be considered was whether the chances for recovery resulting from an operation would be greater than those offered for a spontaneous and natural recovery. I say natural recovery, because you should remember that this may perfectly well occur. Since a certain hesitancy was allowable, I could not come to a decision. Certainly, one should not forget the advantages presented by antisepsis and asepsis, and above all the great skill of the surgeon; nevertheless,

the patient runs a great risk, and the responsibility is considerable. I therefore still hesitated, but the next day the general condition had become more serious. The fever had increased, the distention of the abdomen was more manifest, and the hepatic dulness had disappeared, which proved that the abdominal cavity was filled with gas. There was now no longer any hope of a recovery, and we were forced to have recourse to surgery. Professor Tillaux examined the patient, and, notwithstanding his habitual prudence, advised surgical measures. After having anæsthetized the patient, subumbilical laparotomy was performed; the intestinal loops were agglutinated by a fibrous magma, and purulent in places. The gall-bladder was perfectly normal. A small opening was discovered in the gastric cavity. The trouble was, therefore, perforation of the stomach, and not, as had been supposed, a biliary calculus. This ulceration of the stomach was the cause of the peritonitis and of all of the symptoms observed. The peritoneal cavity was washed out with sterilized water, the opening in the wall of the stomach was sutured, and drainage established. Notwithstanding this intervention, the vomiting, which had not even ceased under the influence of the chloroform, continued; the general condition became worse and the patient succumbed. At the autopsy, the perforation which had been found during the operation was seen near the pyloric orifice; it measures one and a half centimetres in diameter. The case was thus one of a simple ulcer of the stomach, but the peculiar feature about it was the seat of the ulcer. Usually it is situated along the small curvature. Also, the patient rarely dies from so small an ulceration; I mean to say, that in the majority of cases the ulcer has time to develop and to assume much greater proportions. This case goes to prove that it is not always the largest ulcers which are the most dangerous.

The ulceration of the stomach in question had given rise to peritonitis in the subdiaphragmatic region. This is not an exceptional variety,—it has been given the following names: *pseudo-pneumothorax*, *subphrenic abscess*, and Debove has called it a *gaseous abscess*. These various names have given rise to considerable discussion. I must say that they have no great meaning for me. What is the actual condition? A purulent peritonitis, circumscribed in the right subdiaphragmatic region, in the same way that it might be circumscribed in any other. It therefore seems to me quite useless to further discuss the subject; it is not the name which is important but the thing itself. The question is not the finding of a special designation for this variety of peritonitis, but rather the learning how to diagnose it. This point

merits all your attention, as the diagnosis presents very great difficulties. Shörlein published, in 1890, thirty-five cases of circumscribed subdiaphragmatic peritonitis, one of these being a case under his own care; other authors have cited several cases, and the whole number reported is about forty. Let us first consider the manner in which it originates. In the majority of cases, a perforation forms the starting-point of the inflammatory process. Of the thirty-five cases referred to by Shörlein, ulcers of the stomach existed in eleven. It is especially interesting to note that in several cases the initial lesion was inflammation of the vermiform appendix. This may at first appear strange, but a little reflection will explain the occurrence of this phenomenon. In reality the inflamed vermiform appendix follows the course of the large intestine, and extends upward to the space between the liver and the diaphragm, and there gives rise to inflammation of the peritoneum.

Traumatism and cancer have also caused peritonitis, and, finally, in one case, it was a foreign body, a hair-pin which had been swallowed, which formed the primary cause of the subdiaphragmatic form.

How does it happen that the liquid gravitates to the space between the liver and the diaphragm? The gases ascend, but the fluids should descend, if the laws of nature are followed. The penetration of the liquids into this space is explainable as follows: In the normal condition the liver, which is the heaviest of the abdominal viscera, is closely applied against the diaphragm, so that nothing can penetrate between them, but when the liver descends the pressure in the subdiaphragmatic space is lessened, and the fluid precipitates itself into it. Once the liquid has penetrated, adhesions are formed which enclose the contents; in this way a true abscess is produced.

I now come to the symptoms: they are those observed in all cases of peritonitis, vomiting, distention of the abdomen, etc., so I will not dwell particularly upon them. Sometimes latent cases, which are the most terrible, are met with; the malady evolves without giving rise to the slightest symptom; the patient does not suffer nor complain in any way, and suddenly falls into a comatose condition and dies after a few hours. I had occasion to observe a case of this kind. The patient was a young woman who had been confined a short time before. She was walking in the garden with her baby, when she suddenly felt ill and fainted. She was immediately carried in-doors, and five hours later she died. An autopsy was performed, and the entire abdominal cavity was found filled with pus. You will understand that this pus was not formed all of a sudden, and that it had slowly accumulated,

but its presence had not given rise to any trouble; the poor woman was feeling so well that she had gone to walk with her infant.

In our patient the peritonitis was circumscribed, and in such cases the diagnosis sometimes presents almost insurmountable difficulties, particularly in regard to the differential diagnosis from diaphragmatic pleurisy. In reality, in the latter case it is the upper surface of the diaphragm which is inflamed, while in peritonitis it is the lower part. The two lesions are only separated by the thickness of the diaphragm. In making the diagnosis one should base one's opinion upon the presence of pain; simple ulcer of the stomach is painful in the great majority of cases, the absence of pain is quite exceptional. Gastric disturbances previous to the appearance of the peritonitis also form an important element of diagnosis. But if you have the misfortune to encounter one of those cases, rare it is true, in which all the symptoms are latent, there being neither pain nor gastric troubles present, you will find it very difficult to solve the problem presented as to whether you have to deal with subdiaphragmatic peritonitis or diaphragmatic pleurisy. One of the important features in peritonitis is the suppression of the movements of the diaphragm and the descent of the liver. Recourse may, besides, be had to exploratory puncture; if the diaphragm is not paralyzed you will observe the acceleration in the penetration of the pus during the infiltration. During the act of inspiration the diaphragm descends and presses upon the liquid confined between its lower surface and the liver, forcing it into the tube, while during that of expiration precisely the opposite occurs. If, however, this organ is paralyzed, as in peritonitis, naturally these variations will not be observed. This fact thus forms an element of diagnosis, but the latter becomes more complicated when there is no gas present. In this case the change in the sound produced is much more sudden. When there is a mixture of liquid and gas, the sonority changes from one moment to the next according to the displacement of the liquid. Without dwelling any further upon this point, let us now return to the case under observation. At a certain moment the vomiting ceased, thus promising an amelioration of the trouble; unfortunately, a deceptive indication. This arrest of the vomiting is not exceptional, ordinarily it ceases about fifty hours before death. I may add that in very severe cases of ulceration with perforation, recovery has taken place after surgical intervention. Debove has cited such a case. In another case reported it was found necessary to penetrate into the abdominal cavity through the pleura. Pneumothorax resulted, but the patient recovered. This, I may add in passing, proves the fact that pneumo-

thorax is not in itself such a very serious affection and that it is susceptible of complete recovery. The precedent having been established, we are justified in resorting to operative measures, but, it must be said, as I have already stated in the beginning of this lesson, that the results of these operations are not usually very brilliant. In statistics furnished by a German physician we find in nineteen cases nineteen deaths occurring on the fourth day. Another report gives five deaths in eight cases of surgical intervention. Finally, I found it necessary to operate, since recovery was, so to speak, impossible otherwise, and operative measures offered some little chance of success. The case was very serious, and the patient almost exhausted, which caused us to decide upon operating. I particularly mention this point because, when you have to deal with enfeebled and greatly prostrated patients, I would advise you not to operate, as the operation would offer no chance of saving the patient.

One thing more and I shall have finished. What was the immediate cause of the death of our patient? Pulmonary congestion. At the autopsy both lungs were found very much engorged; this condition is, moreover, met with in all cases of this kind. The patients die in consequence of the pulmonary congestion.

COMPRESSION OF THE SUPERIOR VENA CAVA BY A SARCOMA.

CLINICAL LECTURE DELIVERED AT THE PARIS MEDICAL SCHOOL.

BY PROFESSOR JACCOUD,

Professor of the Practice of Medicine in the Faculty of Medicine of Paris.

GENTLEMEN,—A short time ago you saw me stop before a patient whose appearance, no doubt, impressed you. I may tell you at once that the case in question is a relatively rare one,—namely, compression of the superior vena cava by a neoplasm. The patient, who is thirty-three years of age, a brewer by trade, of vigorous constitution, entered our service several days ago. On looking at him two things strike the examiner at once,—his aspect and his attitude. His appearance is very striking, the face being extremely puffy, both in the anterior and lateral portions; the neck, likewise, presents the same puffed-out appearance, as the whole head and neck are œdematous. Even on the scalp traces of this œdematous condition exist. The color of the skin is slightly cyanotic. This peculiar appearance at once indicates that this man is suffering from compression of the superior vena cava. The puffiness and the cyanosis—the circumference of the neck is forty-nine centimetres instead of forty-three centimetres—are merely the result of this compression. Now, uncover the patient and examine the arms and shoulders. You naturally expect to find the same œdematous condition as that observed on the face and neck. But the arms and shoulders are in no way tumefied, and are absolutely normal in appearance; the forearms and the hands, on the contrary, present the same puffy and cyanotic condition as that noticed on the face. You will readily understand that it is not the same condition which has caused the œdema of the face and that of the forearms and hands. It is evident that if it were the compression of the superior vena cava which had occasioned the œdema, the latter would not have been localized, but would also have affected the arms and shoulders. Another cause also exists, the

formation of local venous thromboses, and I repeat that the œdema of the forearms and hands is absolutely independent of that of the face and the neck. So much for the aspect of the patient, and you see it goes a great way in leading you to formulate a diagnosis. Œdema of the face indicates compression of the veins directly interested,—that is to say, the jugulars; and as you find no cause for compression of this vein, you are justified in concluding that the obstacle is lower down, and that there is, consequently, an intrathoracic compression.

Let us now consider the attitude, which is also very interesting. The patient is sitting up, and has the trunk greatly inclined forward; you will see how important this special position is as regards the diagnosis, and how easily it is explained when we arrive at the true cause of all these symptoms. To return to the attitude, the trunk thus leans decidedly forward, but this is not all; the patient is able to breathe, more or less freely, only in the position assumed. If he attempts to sit upright he immediately breathes with difficulty, and in the horizontal position becomes almost suffocated. In a lecture delivered in 1884 concerning a subject affected in the same way, I demonstrated the value of this position. Whenever it is met with in connection with the characteristics which I have indicated, it offers a symptom of *pathognomonic value*. It occurs only in two diseased conditions: either when there is an intrathoracic tumor, so situated that the recumbent, and even the upright, position causes compression of the lungs, or when there is anterior mediastinitis. In the latter case the compression is exerted by the traction of the inflammatory connective tissue, and it is less severe than when there is an intrathoracic tumor. It sometimes happens that the two causes are associated, and then the patient is unable to change his position at all; the slightest change may cause suffocation. Two diseased conditions may exist, therefore, either of which may induce difficulty in respiration, accompanied by œdema with cyanosis of the skin.

Now, what is the cause of the symptoms in the case before us? Is it anterior mediastinitis? is it a tumor? Prior to an examination of the patient we should review the information received from him. The first question is, as to whether anything exists in the previous history of the patient which could lead us to suppose the presence of mediastinitis. No. He has never suffered from pericarditis nor any thoracic affection. He has enjoyed good health excepting only an attack of measles in childhood, and one of "la grippe" in 1890. Do we find any indication as to the manner in which the dyspnœa first occurred? Yes. How far back does this malady, which, in my opinion,

will lead to his early death, date? To the month of January, 1895. This very robust man was, to all appearances, perfectly well up to that time. It was on the 1st day of January—you see the patient gives a precise date—that he first noticed a certain weakness and a slight difficulty in breathing. From the 1st of January to the 7th of February the respiration was somewhat laborious, and the weakness continued; but, all in all, he did not feel so very ill, and could remain in the recumbent position. On February 7 the horizontal position became impossible, and the patient could no longer lie down. Apart from any reservations we may make concerning the statements of the patient, it is certain that this change, if not actually sudden, was at least very rapid. Since this period he has been obliged to remain in about the same position. The most he can do is to lie on the left side with the legs flexed and the head very high.

Now, with what diseased condition does this insidious onset correspond? All observations go to prove that it indicates a thoracic tumor. In this case the onset of the dyspnœa has been very sudden, and death will soon result. At the autopsy an enormous cancer of the mediastinum is sometimes found, or there may be a sarcoma of the lung. I long ago published an account of a case of this kind. An engineer, very strong and robust, was suddenly, while on his locomotive, attacked by dyspnœa, which soon bordered on suffocation. He was brought to the Beaujon Hospital, where I happened to be at the time; the dyspnœa increased, and he died three weeks later. At the autopsy a sarcoma was found. You should bear in mind the fact that an intrathoracic growth may remain latent during quite a long time, and then suddenly make its presence known by dyspnœa. Therefore, the manner of the beginning of the trouble in this man would lead us to favor this idea, and even a superficial examination proves that it is correct. Nevertheless, if one contented oneself with looking at the face and neck, and neglected auscultation, an error in the diagnosis might be the result, and I wish to call your attention to the possible mistake to be made. Whenever you have before you an individual having a swollen neck, all accessible regions should be examined, in order to be sure whether there may not be ganglionic lesions, acting as a cause of the symptoms observed. Well, then, let us suppose that you find several ganglia of augmented volume. If you then consider the fact that the disease occasions not only an increased volume, but also a modification of the consistency, you may say that in the inguinal region there are one or two ganglia which are not normal. These may also be found in the left subclavicular region. Under the influence of these

facts one may wrongly rely upon appearances, and say, "adenopathy." One should never merely confine oneself to a hasty presumption, but should always push one's investigations to their extreme limit, and make a very complete examination. With regard to our patient, I emphatically say that there is no adenopathy, but an enormous tumor of the anterior mediastinum. In order to convince yourselves of the truth of this diagnosis, you have only to percuss the thoracic region. You will meet with a stone-like dulness, very marked in front, on the median line, projecting beyond the sternum on both sides,—a little more on the left than on the right side. Such dulness can only result from a homogeneous body in one block, and of considerable resistance. You will now readily understand how it is that the patient cannot breathe except when the body is inclined forward. In reality, in this manner the tumor applies itself closely against the sternum, and scarcely compresses the lungs; if, however, he attempts to assume an upright position or to lie down it presses upon the lungs, and interferes with the respiration more or less, according to the degree of the inclination. Now, is the left lung simply compressed, or is it invaded by conglomerations of cells? I am not in possession of sufficient facts to solve this problem. In order to affirm this it would be necessary to hear râles, either in a single place or at several points. I heard nothing of the kind. I did hear a râle in the region of the left bronchus, but this proves nothing, and simply results from the compression; the râle which might enlighten us concerning the condition of the lung should correspond with that of bronchitis. I believe, however, that the lung is involved, and find my reason for this opinion in the abdomen. In this patient the liver is enormous, and extends below the umbilicus; the increased volume affects all the diameters, the left lobe almost fills the left hypochondrium. Upon percussion we find exactly the same dulness as in the thoracic region. The liver is evidently invaded by the same new formation, which is a sarcoma. Analysis of the cases reported demonstrates that sarcoma affects the lungs and the liver with the same frequency, so that it is difficult to decide in which organ it had its origin. Were it not that we know that these tumors may remain latent, one would be inclined to suppose that the liver was first affected on account of the appearance of the dyspnoea; but as I have already said, the period of its occurrence does not indicate that compression did not previously exist.

I now come to the condition of the blood. Intrathoracic sarcomata occasion pronounced anæmia, which may exceed in intensity all other forms of anæmia. Indeed, at the present time, a great many German

physicians almost go to the length of saying that the primary cause of pernicious anæmia is a sarcoma. I do not share this opinion, and if I mention it here it is merely to show you that the existence of anæmia has long since been noticed in these cases. The following are the results of the analysis of the blood of a patient I had in 1885. This analysis was made by Dr. Berlioz, who was at that time attached to my clinic, in charge of the chemical department. The number of red corpuscles hardly exceeded a million,—that is to say, was less than one-fourth of the normal number; the number of white corpuscles was five hundred and thirty; an enormous number when we consider that for the quantity of red corpuscles given above there should be only eighteen white corpuscles. Hæmoglobin, $\frac{1}{100}$ instead of $\frac{1}{10}$. Three days before the death of this patient the number of red corpuscles was five hundred and forty thousand. It would be difficult to find an example of more pronounced anæmia.

But to return to our patient, who presents a sarcoma which has involved the anterior mediastinum, the liver, the ganglia, and probably the left lung. This multiple invasion should not surprise us when we consider that a sarcoma is a tumor eminently susceptible to diffusion. Do not imagine that it is exclusively the ablation of the tumor which causes its generalization,—not at all. There are cases in which the sarcoma has become generalized without having been subjected to any surgical intervention. The initial seat of the trouble is of no importance. In one case the starting-point was the iliac bone; in others, the liver or the patella; in three cases, the mediastinum; again, in others, the pleura, the right lung, the humerus, and the parotid gland. Thus you see that the primary points are multiple; any part of the organism may be first attacked. Diffusion is always possible, and bears no relation to the original seat of the trouble. Generalization occurs in all the organs, but most frequently in the heart, the pericardium, and the lungs. In the heart the deposits are sometimes very small, and may remain unnoticed without a careful examination. They were found in one case in the ventricular septum; the initial lesion in this instance was in the liver. In the patient previously referred to with regard to the analysis of the blood, there were deposits in the pericardium and the lungs. I should state that these two foci of generalization were diagnosed during the lifetime of the patient, as I found manifest signs of dry pericarditis, and in the lungs a very distinct dry rale. Here the initial seat was the crest of the ilium. In our patient I believe the tissues to be invaded by the sarcoma. In cases in which the sarcoma has extended into the lungs, the sputum presents a peculiar color; it has been called “grass-

green sputum." This color, be it stated in passing, was long since cited by Traube in cases of pneumonia in which resolution does not take place. Our patient does not present this symptom, neither does he show the two symptoms which have wrongly been considered as indispensable in proving the existence of intrathoracic tumors. I refer to the swelling of the jugular veins during the act of inspiration (in the normal condition the contrary occurs) and to the "paradoxal pulse,"—that is to say, the weakness of the pulse extending sometimes to total effacement. The two latter symptoms, I repeat, are not always present; for their production, the condition which I have designated as "enclosing mediastinitis" must exist,—namely, mediastinitis accompanied by the formation of fibrous tracts enclosing the aorta and the jugular veins.

Notwithstanding the absence of these two symptoms, basing my belief upon the appearance and the attitude of the patient, as well as the considerations which I have described to you at length, I adhere to my diagnosis of compression of the superior vena cava by a sarcoma affecting the mediastinum, the liver, the ganglia on the left, and probably the left lung. This man will not live long. Death may occur in two ways. Either the tumor will continue to develop, and will augment the hæmatisis until insufficiency has been reached, or the patient may succumb in consequence of *cerebral oedema*. The compression of the internal jugular vein becoming greater, the return of the blood takes place with difficulty, and the oedema extends to the brain,—it is literally inundated, or in other instances the ventricles become filled with serous effusion. The patient then falls into a state of somnolence, and dies in a coma. It is impossible to predict with certainty the time of this fatal termination; it may occur at any moment, but at all events it is close at hand.

TWO CASES ILLUSTRATING AN IMPORTANT COMPLICATION IN SCARLET FEVER.

CLINICAL LECTURE DELIVERED AT THE CHARITÉ HOSPITAL, BERLIN.¹

BY O. HEUBNER, M.D.,

Professor in the University of Berlin, and Director of the Pediatric Clinic, etc.

LECTURE I.

GENTLEMEN,—The patient who is just now being carried into this room is suffering from a severe form of "*scarlatinal diphtheroid*," as I have termed the affection, which is about the worst complication that can occur in scarlet fever.

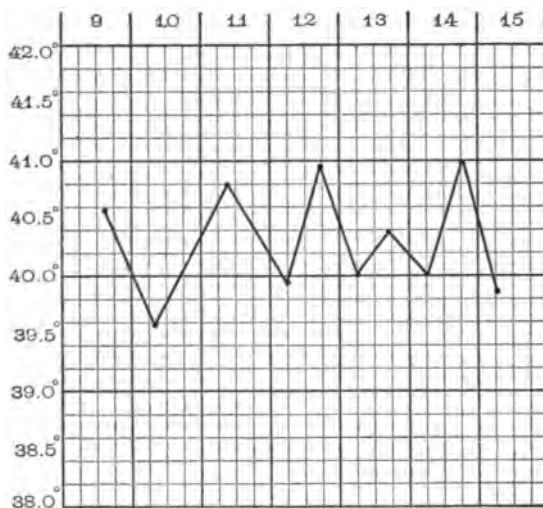
She is a little girl five years old, moderately well developed for her age. This is the fifteenth day of her illness. She fell sick with the usual symptoms,—high fever, headache, and vomiting. The eruption came out on the same day, which is uncommonly early. It was not until the ninth day that she came under our care. Her temperature was still very high at that time, oscillating between 40° and 41° Celsius (104°–106° F.). (See temperature chart, Fig. 1.) It is a very bad sign when there is as much fever as that in the second week of scarlatina. You have but to look at the child and you cannot help realizing that she is in a critical condition. Directly the covers are thrown back she begins to tremble violently, owing to nervous weakness in consequence of the fever. Her face is shrunken, pale, and "discomposed," to use the term invented by Wunderlich; her eyes are wide open, the lips parched and dry. A considerable swelling occupies the right side of her face; an inexperienced eye might take it for mumps; it is not an enlargement of the parotid gland alone, though that is enlarged, but a bunch of enlarged glands at the angle of the jaw. General phlegmonous infiltration of the subcutaneous tissue all about that part renders all outlines indistinct. On the left side a similar "*bubo*" is discerned. Both attained their present size, which is almost that of a man's fist, within the last few days. The disease is thus seen to have assumed

¹ Reported by H. Cleves-Symmes, M.D.

a character resembling "bubonic plague." The child has continual slight delirium, and is unable to recognize its own parents.

Looking into the throat for the cause of the external swelling, we find huge patches of fibrous deposit at the back of the mouth and on the tonsils, which latter are perforated by large holes looking as though they had been punched with an iron. Glairy mucus is adherent to the walls, and many places are covered with membrane. Numerous ulcers are visible also behind the tonsils along the pillars of the fauces. This is the true diphtheroid form of scarlatina, due to infiltration of the tissues by streptococci. In cases that have succumbed on the fifth or sixth day, and which we have examined by the microscope, we have

FIG. 1.



Hyperpyrexia in scarlatina.

invariably found dense masses of the streptococci not only on the surface, but also deeply embedded within the tissue itself, and extending as far as the lymphatic glands. This is found to be the case, not in one or a few spots merely, but all over each individual section you may examine. Under the first of those microscopes over there you will find the field traversed by a number of narrow blue lines each composed of a multitude of specks: that is a section through one of the anterior pillars of the fauces, and those blue ribbons are lymphatics crowded with germs. You know what the action of these streptococci leads to. In the cases of infection by scarlet fever they appear to be even more virulent than usual. They may produce abscess, as in a case of erysipelas

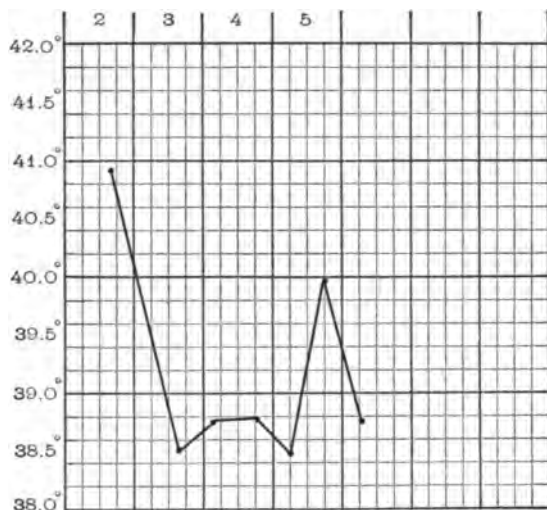
in an infant which some of you may remember to have seen. A retropharyngeal abscess was there developed wherein none but typical streptococci were found. It was lanced and the child ultimately recovered. In this case, in place of an abscess, a septic phlegmon has established itself. The tissue thus infiltrated dies off and becomes necrotic. Three-fourths of the number of deaths occurring in scarlatina are owing to these streptococci! The inflammations set up by them may befall various parts of the body. You have seen one case where all the joints were attacked by strepto- (not staphylo-) coccus suppuration. At other times it is a purulent pericarditis or pleuritis, or, in short, some other localization that puts an end to the patient's life. The body in general is invaded by these minute organisms, which use the natural channels, the blood-vessels, along which to advance. I fear, nay, I am certain, that they will prove too much for this poor child.

This other little patient, though suffering from the same complication, affords a striking contrast to the child you just now saw, not only in appearance, owing to the stage being an earlier one, but also in regard to the prognosis, since its condition has been recognized and effective remedial measures have been instituted from the very outset. For this diphtheroid affection is to be feared far more than any of the other sequelæ of scarlet fever, one of the reasons for which, apart from its inherent malignancy, lies in the fact of the danger very frequently not being realized in time. Had the former case come under our care as early as this one, the outcome would, in all probability, have been different.

We have here a little boy three and a half years of age, well built and of normal development. His history presents no unusual features. Five days ago he was taken with scarlatina. The face is flushed with fever, but the expression of the features is composed. The eruption is still plainly visible; the tongue presents the well-known strawberry-like appearance. Below either angle of the jaw non-painful swellings of the size of a bean may be felt. These are not the tonsils, as many students seem to think, but enlarged glands, the result, as a rule, of tonsillar inflammation and swelling. Another mobile gland is perceived behind the sterno-cleido-mastoid muscle. Now, the temperature chart of this case is most instructive. You notice how the line goes down on the third day, and then on the fourth day *again rises*. That is the usual way with this trouble. You must not allow yourself to be misled by the apparent subsidence of the fever, but remain on the alert. In the normal course of scarlatina the temperature falls steadily, the

decline not suffering a single interruption. In order to keep track of these variations you should leave a thermometer with the mother, or

FIG. 2.



Recrudescence in scarlatina.

cause her to buy one, with instructions to measure the child at regular intervals and note the temperatures found. You yourself should be provided with a chart on which you may mark the results at each visit and trace the connecting lines. A graphic representation of this kind makes the matter much clearer for the eye and the brain than mere numbers. You will thus avoid recognizing the mischief when it is too late, as happens so frequently. The fever falls on the fourth day or thereabouts and the parents rejoice; a slight swelling of the glands sets in, but is overlooked; then about the sixth day there is a new rise of temperature, but this is regarded as transitory and unimportant; finally, about the eighth day you are anxiously consulted, when the mischief has already been done.

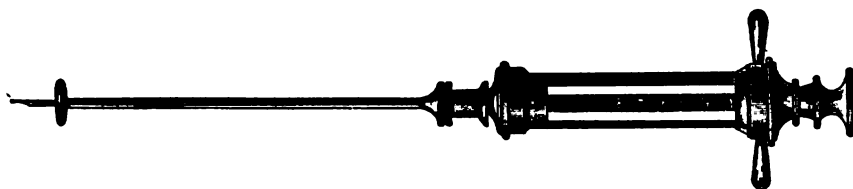
For all his present reassuring appearance and the seeming absence of danger, this little boy is threatened with the same fate as the girl I showed you a little while ago. A new access of fever, however slight,—it does not, by any means, require to go as high as in our present case,—during this period is invariably attributable to diphtheroid. If visible alterations in the throat are absent, that does not alter the case, and you must not let it influence your action. Tissue necrosis never sets in before the fourth day. It is of the type which Cohnheim and

Weigert have termed necrosis by coagulation; the parts thus affected are easily recognized in stained specimens by their not taking the stain. Preparations made at this period show by numerous blank specks where necrosis has set in. At the same time when this occurs streptococci first make their appearance within the tissue. Whether they cause this necrosis or only settle within portions already necrotic is a question of theory which I cannot here discuss. It is enough that they are there from this moment forth, and that they spread so rapidly as to make their way into the lymphatic glands in the course of the same day. You will find such necrotic spots on the tonsils of our patient. They are of a brilliant whitish-yellow, and at first sight are not distinguishable from genuine diphtheria. Yet they are something essentially different, as Hensch and I have been maintaining for the last twenty years. Although anatomical differences could long ago be made out, it was not until the advent of bacteriological investigation that a differential diagnosis could with certainty be made. In true diphtheria the diphtheria bacillus is found in the membranes; its growth is confined to the surface, it is only the toxins thereby produced that enter the system; whereas here streptococci alone are present, both along the surface and invading the deeper tissues.

Superficial disinfection naturally is of small use, however frequently and conscientiously it be performed. It is even dangerous when often repeated, as much of the poisonous disinfecting material is swallowed. Harmless and at the same time powerful disinfectants have yet to be discovered. Now, the method which I have employed for fifteen years, and which at last has met with general approval, having been adopted by such men as von Ziemssen and Widerhofer, is effective, not attended with any danger, and easy of application. It consists in the injection of small amounts of carbolic acid into the diseased parts, the pillars of the fauces, the velum, or the tonsils. The fluid injected follows the same road as the germs, it overtakes them, travelling as far as the glands, and impedes or puts a stop to their development. The glands soon grow to be smaller, the fever falls, and the general condition improves. The local condition thereby is often injuriously affected for a time, the punctures serving as so many inlets for new bacteria to settle in (the carbolic acid having been carried deeper into the tissues); but that is of no import so long as the infection is thereby prevented from spreading, and the patient's life saved, for no child has yet succumbed to the local affection as such. In one case only have I observed a fatal termination, and that was owing to hemorrhage from erosion of the ascending pharyngeal artery by the local process. Con-

sidering the number of cases treated by injection, and taking into account that I now use a needle with a protective shield near the point, of which a specimen (see Fig. 3) is being passed around among you, I think I can safely advise you to adopt this method in your future practice.

FIG. 3.



Syringe for pharyngeal injections, fitted with a guard.

I shall now show you how it is done. You roll the child up in a blanket, so as to confine the arms, and let the mother hold him. With a spatula you press down the tongue, and now you swiftly run in your needle somewhere in the back of the mouth and inject. It does not much matter where you enter, the tongue being protected by your spatula, as the fluid is sure to be carried to the same glands. The needle, you observe, is long and stout, so there is no danger of breaking it, and the shield prevents it from going too deep. The operation, if I may call it so, was over long before I had done with my description, so easy and swift is it. I recommend you to use no more than half a Pravaz's syringe ($= \frac{1}{2}$ cubic centimetre $= 8$ minims) at a time, and to employ a three-per-cent. solution of carbolic acid. The injections should be made twice a day, and this treatment continued for one week. I hardly need mention that you must not intrust this duty to a member of the family, or any other person, but attend to it yourself, even though it interfere with your convenience. I do not promise that every case will be cured thereby, but many will, and you will, in my opinion, succeed in saving a greater number of lives than if you used exclusively the usual disinfectant treatment.

HÆMATURIA AND ITS SIGNIFICANCE.

CLINICAL LECTURE DELIVERED AT THE ROYAL INFIRMARY.

BY THOMAS OLIVER, M.A., M.D., F.R.C.P.,

Fellow of the Royal Society, Edinburgh; Professor of Physiology in the University of Durham and Physician to the Royal Infirmary, Newcastle-upon-Tyne.

GENTLEMEN,—Blood or its coloring matter is met with in the urine under a variety of circumstances. The tint assumed by the urine naturally depends upon the quantity of blood or hæmoglobin it contains. If only a trace is present, it may be simply smoky, or its color may be red owing to the blood being equally diffused through it. When allowed to stand a chocolate-colored grumous deposit may be observed. Urine exhibiting these characters has generally had the blood added to it on its passage through the kidneys. In cases where the ureters, the bladder, or the urethra is the source of the hemorrhage, the color of the urine is generally pinkish or vermilion and it frequently contains clots. Patients who are suffering from hæmaturia do not always void bloody urine. It is characteristic of urine contaminated with blood from a vesical source, that for several hours or days in succession it may be quite free from all traces of blood. To distinguish renal from vesical hemorrhage is not always easy. It has been recommended to syringe the bladder, and if the water as it immediately flows away is blood-tinged, such a circumstance would suggest a vesical origin, whereas if the source of the hemorrhage was higher up no blood would reappear in the urine for a few seconds. The cystoscope too, in the hands of careful observers, has enabled the source of the bleeding to be correctly determined.

As a rule, the presence of blood in the urine is readily detected by the unaided eye. Confirmatory evidence is easily obtained by the microscope, when numerous blood-cells may be observed, pale and swollen and not forming rouleaux. Occasionally renal tube-casts containing blood-corpuscles may be noticed. In addition, such a chemical test may be employed as the addition of tincture of guaiacum and per-

oxide of hydrogen, when the urine will exhibit a blue line at its junction with the other liquids. I frequently find clinical clerks make mistakes with this test. The shade of the blue color is important. If, for the sake of illustration, a patient is taking iodide of potassium, the addition of tincture of guaiacum and peroxide of hydrogen to his urine will develop a greenish-blue color frequently mistaken for that given by blood. Heller has supplied us with another chemical test when there is a suspicion of hæmaturia. Liquor potassæ is added to the urine and then boiled: the earthy phosphates as they are precipitated bring down the coloring matter of the corpuscles, producing reddish flakes readily recognizable on standing for a time. The causes of hæmaturia are threefold:

(1) Local,—*e.g.*, injury, violent exercise, calculus, inflammatory conditions, cancer, tubercle, parasites, and Bright's disease.

(2) Symptomatic,—*e.g.*, purpura, scurvy, fevers, including malaria, ulcerative endocarditis, and mental emotions.

(3) Supplementary or vicarious.

When the blood comes from the kidney there are generally tube-casts found in the deposit in the urine. In Bright's disease, when renal bleeding occurs, it is, generally speaking, scanty,—just sufficient to impart a smoky tinge to the urine, but in not a few cases I have found it pretty severe and continuous. In renal cancer, on the other hand, the hemorrhage may be profuse, whereas in tubercle, abscess, and renal embolism it may be very trifling. It is astonishing the amount of hemorrhage a small stone in the kidney may cause, particularly if it is rough on the surface and freely movable. A common cause of renal hemorrhage is a stone falling into the pelvis of the kidney. The patient under these circumstances generally refers his symptoms to the loins, and in cases where the bladder is the origin of the bleeding he points to the suprapubic region. If the latter, the bladder should be explored for stone or villous growth, and if found the case must be dealt with surgically. It should be borne in mind that in cases of villous growths in the bladder it is no uncommon thing for small portions of these growths to become detached. In one of my own cases the patient would pass, now and again after a hemorrhage, small masses varying in size from a pin's head to a small pea, whitish gray in color, and these on microscopical examination were found to be composed of heaps of large round cells with nuclei, evidently sarcomatous in their nature. When portions of villous growths are thus passed it is not an unusual thing for hemorrhage to cease for months.

There is a form of bleeding from the kidney called intermittent or

paroxysmal hæmaturia, hæmatinuria, or hæmoglobinuria, but as only the coloring matter escapes and its presence in the urine is not constant but occurs at intervals, the term "paroxysmal hæmoglobinuria" is the most correct. No blood-cells or very few are met with in the urine in this affection, but albumen and a considerable amount of pigmented *débris*. People who have had ague are particularly liable to paroxysmal hæmoglobinuria, especially after exposure to cold. In nearly all instances cold seems to be the exciting cause. This is followed by a rigor, and the urine which is voided shortly afterwards looks as if it contained pure blood. On standing, only a brownish-red pulverulent deposit comes down, which on microscopical examination is found to be *débris*, no corpuscles or only very few being detected. At other times the urine may be only smoky or it may have the color of port wine, and on standing it separates into two layers, the upper stratum being bright and having the tint of red wine and resting upon a layer of grumous deposit. If warmth has been applied to the body the shivering ceases and the urine may quickly regain its normal characters. Repeated seizures of this kind ultimately cause a semi-jaundiced condition of the skin. Whilst cold acts as a determinant, it is more than probable that it simply acts upon a constitution peculiarly influenced by some hereditary tendency or weakened by malaria, alcohol, or syphilis. Under any circumstance, once the tendency to paroxysmal hæmoglobinuria has become pronounced, the individual's resistance to cold is ever afterwards much diminished. He simply cannot bear exposure to cold. In the intervals between the attacks the urine may become perfectly clear and normal, indicating that the kidneys are presumably healthy, but as time goes on and the attacks are repeated, there is considerable risk of the kidneys becoming affected, and of hæmoglobinuria being followed by hæmaturia. A symptom frequently complained of at the commencement of an attack is pain in the back. There is little doubt that this is due either to an afflux of blood to the kidneys, causing congestion of their vessels, or to the passage along the tubuli and ureters of corpuscular *débris*. Repeated congestion of an organ we know is apt to be followed by increased formation of connective tissue. Such a fibrosis has been found post mortem in the kidneys of those who have been for a length of time the subjects of paroxysmal hæmoglobinuria. In which part of the body the blood-corpuscles are disintegrated in order to give rise to this affection it is impossible to say. It may be within the blood-vessels themselves or within the liver. The kidney naturally suggests itself as the seat of the breaking up of blood-cells, but against that theory must be

placed the fact that the serum which is removed from blisters in these patients is laden with the products of corpuscular destruction. This suggests, therefore, the probability that the blood going to the kidneys is already rich in the *débris* of hæmoglobin and of red blood-cells.

Paroxysmal hæmoglobinuria is interesting from its association with Raynaud's disease,—in which we have coldness, blueness, and puffiness of the hands and feet, and which may be followed by gangrene. In both affections there is a marked susceptibility to cold. My own opinion of the relationship of Raynaud's disease and paroxysmal hæmoglobinuria is that it is exaggerated by many authors. In nearly all my cases of Raynaud's disease in which both hands alone, or the hands and feet, have been the seat of the most marked and sharply-defined cyanosis, the coldness and puffiness developing on the advent of cold weather and quickly disappearing, the urine has remained free from blood-cells, albumen, and hæmoglobin. That is my experience of Raynaud's disease.

I shall not attempt to give illustrations of hæmaturia from all the causes I have enumerated, but will briefly draw attention to a few of them. What the relationship between the receipt of an injury and the origin of a malignant disease is has never been quite made out, and yet evidence is accumulating that such relationship exists. Writers admit that one of the causes of malignant tumor of the kidney is injury to the loins. All we know is that several months after an accident blood appears in the urine, and this is frequently the first symptom that attracts the attention of the patient. By degrees other signs and physical symptoms appear,—*e.g.*, a tumor in the situation of the kidney may be felt, and in children, especially, the size of a cancerous kidney may be very great, filling almost the half of the abdomen. Pain referred to the loins, hæmaturia, and cachexia are symptoms the importance of which should not be overlooked. At times the pain is very severe, and whilst it shoots less frequently down the ureter and testicle than that caused by renal calculus, it tends, on the other hand, to extend to the spine,—a suspicious symptom if severe and persistent, for the growth may then be involving the vertebræ and ultimately it may cause paraplegia. Hæmaturia is not met in every case of cancer, but once it has appeared it continues, for by its presence we presume that the growth has ulcerated. Occasionally the bleeding is so profuse as to cause a rapidly-developing anæmia, and at all times it aggravates any existing cachexia. In malignant disease of the kidney the blood is usually intermixed all through the urine, and although clots may now and then be found

they are small. The hæmaturia in these cases is not much influenced by rest in the recumbent position. On the contrary, recumbency favors the filling of the blood-vessels of the growth, so that the urine passed by the patient after assuming the upright position may contain a larger quantity of blood than it did immediately before his lying down.

Stone in the kidney is a frequent cause of the presence of blood in the urine. Calculi seldom reach a large size in the kidney, and yet on more than one occasion I have seen the whole of the pelvis of that organ impacted by concretions. The presence of even a small stone in the kidney may cause considerable pain. Fortunately it is only one kidney generally that is affected. Pain, severe and recurrent, referred to the loins in an otherwise healthy individual, and followed by bloody urine, is suggestive of stone, but there will be little pain and bleeding if the calculus is encysted or if it has not come into contact with the sensitive mucous membrane of the pelvis of the kidney. The pain may be of a dull character or it may be spoken of as simply a sense of weight. Severity is the usual characteristic of the pain, and to this may be added its radiation along the ureter and to the testicle through the nerve connections of the kidney with the spermatic plexus; the peculiar effect upon the cremasteric muscle and superjacent skin through the genito-crural nerve, and the vomiting and feeling of sickness through the pneumogastric. Add to these symptoms tenderness when the loins are firmly pressed or when the kidney is grasped between the hands, also increase of the pain when the patient walks or drives over a rough road, and we have a symptomatology that points with almost complete certainty to stone in the kidney. Lithic acid calculi cause the least pain, oxalate of lime calculi make themselves felt by acute pain limited to a particular spot, whilst those composed of phosphate of calcium cause considerable suffering, unremitting at first and with a tendency to become paroxysmally aggravated afterwards. The sufferer from renal calculus frequently tries to obtain relief by change of posture; lying on his back, his abdomen, or his side. In renal calculus the hæmaturia is less profuse than in malignant growth, but it is aggravated by movement. Rest in the recumbent position gives relief and checks the bleeding. The urine which was bloody on going to bed at night is frequently quite clear in the morning, a circumstance just the reverse of what we saw occurred in cancer. Occasionally the bleeding is profuse and accompanied by clots when it comes from the mucous membrane of the pelvis. Oxalate of lime calculi cause hemorrhage by their roughly-spiked surface, whilst the stones that are coated with phosphatic material are more liable to cause pus than draw blood.

Given a patient by whom pain in the loins radiating down the ureters is complained of, pain located in the neighborhood of the kidney, relieved by rest in the recumbent position and aggravated by pressure, we have stated that such a combination of symptoms is almost pathognomonic of stone in the kidney, and yet no patients with such symptoms when operated upon have proved more disappointing to the surgeon. Again and again, after the most careful sifting of symptoms, without haste and after the elimination of all other probabilities, the supposed subjects of renal calculus have been operated upon and no stone found.

Within the last few weeks such a case has come under our observation. Henry B., a sailor, was admitted suffering from profuse hæmaturia. The urine varied in depth of color from day to day, but blood was never entirely absent from it. When abroad, years ago, he suffered from malarial fever, and four years ago he had hæmaturia, which continued for a few weeks. Rest in bed and the internal administration of various hæmostatics had practically no effect upon the second attack of renal hemorrhage I am now describing. He complained of pain radiating from the left kidney down the course of the ureter to the testicle and slight retraction of that gland, and he could not bear to have the left renal region firmly palpated. The bladder was carefully explored but nothing therein detected. Everything pointed to the case being one of stone in the kidney. We watched the patient carefully for weeks. As medicinal treatment failed to check the bleeding and the patient was rapidly becoming worse, it was arranged that the left kidney should be explored. This was done by one of my surgical colleagues, but, though the kidney on exposure was first probed all over, subsequently cut into and the interior carefully examined by the finger, no stone was detected. The kidney was replaced, but, unfortunately, the patient never rallied from the shock of the operation. At the autopsy the bladder, kidneys, and ureters were carefully searched for evidence of stone or a new growth. Nothing, however, was found save a small cyst or two the size of a split pea, and on microscopical examination the kidney presented the appearance of commencing interstitial nephritis with fatty granular degeneration of the renal epithelia and several hemorrhages in and under the mucous membrane of the pelvis of the organ.

The memory of a similar case still impresses me. A few years ago Richard W., aged fifty-four, was admitted suffering from pain of a paroxysmal character in the right kidney with hæmaturia, both of which were relieved by treatment. His urine in the intervals became

quite clear, but always contained large quantities of uric acid. The paroxysms of pain became more frequent and the losses of blood so considerable that an exploration of the kidney became desirable. My surgical colleague exposed that organ, but found it a small shrivelled kidney not more than one-sixth the size of the normal, dense and tough. Into it he passed a needle, and, although he probed in all directions, no trace of a calculus was found. For a few days subsequent to this the urine was deeply laden with blood, but by degrees this cleared up, and from the day on which the kidney was subjected to the "needling" until the time of his death, seven or eight years afterwards, there was no return of the renal colic and no reappearance of the hæmaturia.

In both of these cases there apparently had been a degree of interstitial nephritis, and how far such a pathological condition, unequally diffusing itself through the kidney, is responsible for local accessions of increased arterial tension in vessels whose walls are not typically healthy, and therefore yield to the strain imposed upon them, I am not prepared to say.

Obscure pathological conditions, whilst they lend interest to a case, leave us dissatisfied unless we can sift and explain them thoroughly. We never feel quite happy unless we have cleared up all the points of a case, and yet in medicine that is not always easy. In August, 1894, I was asked to see an American gentleman, aged forty-six, a civil engineer, who had reached Newcastle in a very precarious condition. He had been travelling in Norway, and when at Vossvangen had been suddenly seized, after a long day's drive, with profuse hæmaturia. He hurried on to Bergen and thence sailed to Newcastle. I saw him a few hours after his arrival. He was thoroughly jaded and ill, having continued to pass blood in large quantities in his urine for four days. He was sallow and jaundiced. Beyond slight feebleness of the first sound of the heart and an accentuation of the second the condition of the thoracic organs calls for no comment. The liver was enlarged and slightly tender; the spleen was also enlarged. There was no renal but slight suprapubic tenderness on pressure. The urine was dark-red and alkaline. It contained three grains of urea per ounce, and under the microscope myriads of red blood-corpuscles were observed, but no other formed elements.

The history of this case was extremely interesting. It was the gentleman's fifth attack of hæmaturia at intervals of five years,—the first twenty years ago, which came on suddenly and just as quickly disappeared. At the time of his second attack he was up-country, far

removed from the opportunity of getting medical advice, and, although the hemorrhage was considerable, he rode on horseback several miles daily, discharging laborious duties which his work imposed upon him, and thus he allowed the hemorrhage to cure itself. Since then he has had at intervals of five years recurrences of renal hemorrhage, unexplained and causeless, although in one of his earlier attacks the patient was regarded as the subject of malarial fever and treated by quinine, with cessation of the bleeding. As on two subsequent occasions the hemorrhage ceased without quinine, we can scarcely regard malaria as the only factor in the causation of his illness. In each attack the urine became suddenly bloody and without his having experienced any pain. In the present attack the hemorrhage has gone on in spite of antimalarial and other medicinal treatment, rest in bed, etc. Subsequently just as suddenly as the bleeding came it as suddenly disappeared,—leaving the patient thoroughly weakened, but shortly afterwards able to travel to America and resume his professional duties.

In conjunction with Professor Arnison I watched this case with considerable interest from day to day, particularly as no medicine seemed to exert the slightest influence upon the hemorrhage. The patient, who was kept in bed, had no complaint whatever except weakness: he took his food well; was dieted carefully,—principally upon milk. There was never any rise of temperature; the pulse varied from 70 to 80; the urine was always very red, rich in blood-cells, and had a specific gravity varying from 1009 to 1012, containing on an average two or three grains of urea per ounce. On the evening of the 2d of September—*i.e.*, nearly three weeks after the commencement of the bleeding—the urine, which for two days had been observed to be less bloody, was clear for the first time: it had a specific gravity of 1012, contained just a trace of albumen, and three grains of urea to the ounce; under the microscope one or two blood-cells and a fatty granular tube-cast were observed. Next day no blood-cells were found in the urine, nor did blood reappear all the time he remained in Newcastle. How are we to explain the sudden cessation of the hemorrhage? I know of no answer to the question. *Liquor ferri perchlor.* in thirty-minim doses, quinine, and magnesium sulphate were taken for days without any apparent effect. The patient always maintained, basing his opinion upon past experience, that the bleeding would as quickly disappear as it had come, and when once it ceased that it would likely not return. The length of the patient's lifetime over which these attacks were spread—*viz.*, twenty years; their periodicity once in every five years; their apparent causelessness; their sudden appearance and almost as

rapid disappearance, with intervals of good health and fitness for the discharge of his arduous professional duties—raised in my mind pathological problems to which as yet I can offer no solution.

[Since delivering this lecture I have received intelligence of the death of this gentleman in New York. For a few months after his return to America he remained pretty well. Old symptoms re-appearing, it was decided to remove the suspected kidney, but the operation, though successful, was followed by shock, cardiac failure, and death. From these and other cases of a similar nature I am convinced that certain changes in the kidney of an inflammatory or fatty nature may be followed by hemorrhage which is recurrent and extremely difficult to control.]

So far as we have gone we have dealt with local conditions in the kidney as the cause of hemorrhage. However predisposed the kidneys may be to bleed, there are certain constitutional states in which hæmaturia may arise. One of the most marked cases that has come under my observation was that of a girl, aged eleven years, whom I saw in consultation with Dr. R. Campbell, of this city, a few years ago, and whose history is already reported¹ as a case of typhoid fever, in which I considered that the brunt of the poisoning had been borne by the kidneys. Her case was briefly this. The patient had had good health until five days after the illness of a brother, which subsequently declared itself to be enteric fever, when she too became feverish and began to suffer from hæmaturia. Her temperature subsequently ranged from 101° to 104° F., and the hæmaturia persisted. There was never any pain nor were any clots passed. The condition of her chest remained satisfactory. Her illness lasted thirty-two days. It was simply hæmaturia with continued fever. We came to regard her case as one of typhoid fever, she and her brother having been exposed to the same unhealthy sanitary conditions, and the interesting point is that exactly five days after the subsidence of the brother's temperature hers too came down, and from that moment her convalescence was uninterrupted. Ergot and the subcutaneous injection of ergotin and other hæmostatics were administered without producing any effect whatever upon the hæmaturia. We prescribed quinine and the temperature slightly fell, but it was evident that the disappearance of the hæmaturia and the complete fall of the temperature could scarcely be attributed to the quinine, but rather that they marked the end of a specific fever.

¹ British Medical Journal, 1888.

Where hæmaturia occurs as a prominent symptom in the course of a specific fever we may regard it as due either to inflammatory changes in the kidney, and therefore likely to be followed by further changes in that organ later on, or we may consider it the result of the peculiar effect of the poison upon the renal tissue and blood-vessels. That the former takes place we know in scarlet fever in the earliest stages as well as the later, and that in other cases the cause is a toxæmia is shown by the fact that as in the patient just mentioned once the fever subsides the hemorrhage may disappear and no trace of kidney degeneration presumably remain. Certain medicines—*e.g.*, cantharides—cause temporary hæmaturia, probably by acting as renal irritants.

We have spoken of malaria as a cause of hæmaturia, and the case just related indicates the influence of typhoid fever, but a combination of these two conditions occasionally occurs, and to it I would draw your attention. During the War of Secession typho-malarial fever occurred among the American troops. According to Woodward it was the scourge of the Army of the Potomac. In the *Lancet* of 1892 I reported a series of cases that were neither pure malarial nor typhoid fever but a combination of the two, and which, as the patients had apparently all contracted their illness in one particular locality of Europe, I ventured to call "Danubian fever." All the patients had been at Ibraila on the Danube, and had drunk the water from the river. In some of the cases there were not only the ordinary symptoms of malaria,—*viz.*, rigors, sweating, and high temperature, 104° to 105° F., with enlarged spleen,—but a profuse hæmaturia, which rapidly subsided under large doses of quinine. That malaria causes hemorrhage has long been known. It occasionally happens that after death the liver in malaria is found to be the seat of hemorrhages. Besides, there is the interesting case reported by Porter,¹ of the stump of the amputated limb of a patient who had previously suffered from ague bleeding at periods, associated with the presence of malarial symptoms: this bleeding always ceased on the administration of quinine.

Add to these cases the hæmaturia met with in purpura hæmorrhagica and hæmatophilia,—constitutional conditions whose pathology has not been well defined; but in which ill-nourished walls of blood-vessels exist, and it is probable that, owing to the operation of these causes, we can explain cases of hæmonephrosis. I have met with and reported one case of hæmaturia in which the kidney was found post mortem the size of a small cocoanut and converted into a blood cyst, all trace

¹ Medico-Chirurgical Transactions, vol. lix.

of its secreting structure having practically disappeared. The pathology of these cases is extremely obscure. Possibly hemorrhage had first occurred into the submucous layer of the pelvis of the kidney and then gone on accumulating and pressing outward upon the secreting tissue.

The treatment of hæmaturia depends to some extent upon its cause.

To what is the hemorrhage due? If to a stone in the bladder or kidney the removal of such is called for. If it is due to a growth in the bladder it must be removed by the forceps, the blades of the lithotrite, or by cystotomy. Should, however, the hæmaturia be of renal origin and not due to stone or a new growth, then the perchloride of iron in large doses, aluminate of iron, tannin, gallic acid, sulphuric acid, or ergot may be tried. Hammamelis has proved to be a useful medicine in such cases. To some patients ergotin may be administered hypodermically, or if there is constipation, ergot and magnesium sulphate. From the application of cold and ice-bags to the loins I have not seen any special benefit. Of ferripyrin—a compound of chloride of iron and antipyrin—I have had no experience, but it is worthy of a trial. For malarial cases quinine is the one remedy upon which reliance must be placed.

A CASE OF GOUT.

CLINICAL LECTURE DELIVERED AT UNIVERSITY COLLEGE HOSPITAL.

BY GEORGE VIVIAN POORE, M.D., F.R.C.P.,

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GENTLEMEN,—Patients with acute gout are not among the commonest of those admitted to a general hospital, and therefore I deem it advisable to say a few words on the perfectly typical case of this disease which was recently in my wards.

S. P., a man, aged forty-three, earning his living by doing "odd jobs," was admitted on May 17 with a swollen and painful condition of the right big toe. The swelling, which was of a dusky-red color and extended round the metatarso-phalangeal joint and onto the dorsum of the foot, was very tender, and was the seat, as the patient informed us, of continuous pain of a burning, throbbing character. This swelling prevented him from wearing a boot and made standing at once difficult and painful. Beyond the local condition there was little amiss. The patient was well nourished, plump, and rubicund; the tongue slightly furred; the temperature slightly raised (99.2° F.); the urine was acid; specific gravity 1015, and contained no albumen nor any abnormal sediment beyond a slight deposit of urates. He was kept in bed, placed on a soft diet, and given some saline aperient, and left the hospital quite well at the end of a week. The inflamed joint was painted with collodion, which gave marked and almost immediate relief, but beyond the saline aperient no other drugs were in this case necessary.

The attack had commenced suddenly at three o'clock in the morning four days before he was admitted. He states that he is fond of beer and has drunk it freely all his life, and he admits that the day before the onset of his attack he had drunk very freely of beer. He says he "cannot remember how much." The patient states that he

had a similar attack eighteen months ago, and that his father died after an operation for stone at the age of forty-two.

In this case the age, the habits, the previous attack, the sudden onset at 3 A.M., the podagra, the duration, are all typical, and the further fact of his apparent hereditary tendency to gout as evidenced by the death of his father from stone is also typical.

The inflammation of the joint was, in all probability, due to a deposit of urate of soda in and around the joint, and it is probable that we might have obtained crystals of uric acid from the blood-serum had we seen him in the earlier days of his attack. An acute attack of gout is always accompanied by an excess of uric acid in the blood, some of which being deposited in the joints produces the gouty inflammation. This explanation of a gouty paroxysm, which we owe to Garrod, is universally accepted. Nevertheless, I would ask you not to be too exclusive in your attitude towards the uric acid, but to regard it merely as a tangible and invaluable evidence that the blood is overcharged, and for some reason contains an excess of excremental matters which ought to have been withdrawn from it by the kidneys or other excretory channels.

Gout is due to auto-intoxication, owing to a want of balance between the processes of absorption, metabolism, and excretion.

In my lectures on medical jurisprudence I am accustomed to teach that the really operative dose of a poison is the balance between absorption and excretion. It is due to this fact that poisons injected into a vein or hypodermically act, as a rule, far more vigorously than when slowly absorbed through the alimentary mucous membrane. In the first instance the blood suddenly receives a dangerous charge of poison, while in the second, absorption is so slow that elimination is able to keep apace with it and little or no toxic effect results. It is due to the slow absorption and rapid excretion that snake venom seldom produces any toxic effect when introduced into the stomach.

In works on toxicology it is customary to quote the "fatal dose" of each poison. Such figures are very fallacious, because not only do healthy individuals vary in susceptibility but the possession of impaired power of elimination owing to the presence of granular contracted kidney increases incalculably the danger caused by the administration of toxic bodies. We all know, for instance, the extreme intolerance for such drugs as opium and mercury which is manifested by the patient with a "gouty kidney." These patients have an equal difficulty in eliminating the "toxines" of specific fevers, and I have on several occasions during the past few years pointed out to you patients

in my wards whose tendency to relapse in typhoid and rheumatic fevers seemed to be accounted for by the low specific gravity of the urine, which indicated a feeble power of urinary excretion.

It may help towards an appreciation of gout to shortly consider some other forms of auto-intoxication. In diabetes we have to do with a poison which is the result of deranged metabolism, and so soon as elimination of the morbid products is checked, distinct toxic effects are produced. Not only is the diabetic liable to coma but equally with the gouty subject he is liable to a variety of local troubles.

That form of auto-intoxication which we call "uræmia," and which is produced by disease of the kidneys, is due in the main to faulty excretion, and not unfrequently constitutes the final phase of gout.

I may remind you of a case of acute auto-intoxication which was admitted under my care last year,—the case of a young athlete who became insensible and slightly convulsed at the close of a ten-mile race across country,—due, as we thought, to the sudden overcharging of the blood with waste products.

The ordinary "bilious attack," with its headache, malaise, vomiting, etc., such as is common in school-boys who have overgorged, is due to absorption being greatly in excess of excretion.

These cases of auto-intoxication are due then to excessive absorption, deranged metabolism, and defective excretion. Normally, the three processes bear a due proportion to each other, the balance of power is maintained, and "health" is the result. George Herbert's dictum that "man is all symmetry" is only true sometimes. I was once informed by a person of good education, who had undergone "two months hard labor," that he never knew till then the bliss of being in perfect health; a bliss attributable to the fact that his intake was certainly not greater (probably slightly below) his output. There can be no doubt that a fair proportion of those who become gouty are endowed with exceptional powers of primary digestion and a keen appreciation of the pleasures of the table. It is the maintenance and indulgence of these powers and pleasures after the completion of the full development of the body which often determines the occurrence of gout, an occurrence which is hastened by a forced abstinence from physical work or any impaired power of excretion by the kidneys. In these cases the gout is due to a relatively excessive intake.

It has fallen to my lot to see not a few very athletic men with enormous muscular development who have been sorely tried when they have been called upon to exchange the bat for the pen and the sliding-seat for an office-stool. Their symptoms have been obscurely

gouty and accompanied by marked hypochondria. Enormous muscles inadequately worked seem to be a doubtful blessing. The symptoms in these cases are presumably due to a deficient output in the form of muscular work and its accompanying respiratory products.

The marvellous power of primary digestion which is often possessed by the diabetic must have the effect of putting a severe strain upon the liver, and whether the faulty metabolism of the diabetic may not in part be due to the want of balance between gastro-intestinal and hepatic function is at least a question. The great good obtained in some of these cases by administering opium by the mouth, which must partly stop and delay primary digestion, is an interesting fact.

The man with a feeble power of primary digestion, to whom all the pleasures of the table mean stomach-ache, and who manages to live on a surprisingly small quantity of the simplest food, not unfrequently outlives many of the jovial companions of his youth, who succumb to some form of visceral disease shortly after they have passed their prime.

There is probably no absolute measure by which we can gauge the assimilative and excretory power of any individual. Men are as unequal in this as in all other respects. The gouty are, however, distinctly divisible into two classes, the plethoric and the anæmic and emaciated. In the former class the appetite is good, the assimilative power great, and the attacks of gout are acute and often precipitated (as in the case I have brought before you) by dietetic excess. The health between the attacks is often robust. In the latter class adequate nutrition is impossible, there are generally distinct evidences of chronic kidney trouble, and it is probably the chronic difficulty of excretion which determines the malnutrition. Workers in lead afford typical examples of this latter class. Lead is a styptic causing contraction of the blood-vessels and anæmia. It checks excretion from the bowel by bringing about colic and constipation, and very rapidly induces (as has been pointed out by Oliver, of Newcastle) a fibroid change in the kidney and liver. It is to Garrod that we owe a knowledge of the relation of lead-poisoning to gout. He it was who showed that the administration of lead salts to gouty subjects almost invariably determined a gouty paroxysm. This paroxysm is almost certainly due to the arrest of all excretory functions by the physiological action of the lead salts. Although we have at the opposite ends of the scale cases of gout which in the one case are due to excessive assimilation and in the other to defective excretion, we must not forget that we have all grades between, and, undoubtedly, the defective excretion is the fact of most practical value when we are called upon to treat cases of gout.

In treating cases of gout, our efforts must be directed towards the maintenance of a tolerably even balance between assimilation and excretion. Undoubtedly much can be done by dietetic means, but I am inclined to think that hitherto too much attention has been given to the uric acid factor in gout, and, instead of regarding it merely as a certain and most valuable evidence of a loss of assimilative and excretory balance, attempts have been made to check the formation of uric acid in the system by an over-nice and sometimes fanciful regulation of the diet.

Physiologists have not yet given us any acceptable theory of the genesis of uric acid, and one who has thought deeply on the subject and has enjoyed much practical experience of gout has lately warned us that he has been unable to accept any theory. He has abandoned theories in despair, and says "that way madness lies."

It seems certain that it is not an intermediate product between proteid food on the one hand and urea on the other, and there is no evidence that uric acid can be changed to urea by increased oxidation within the body. The fact that uric acid constitutes the chief urinary constituent alike of the hot-blooded and rapidly-breathing bird and the cold-blooded and torpid snake makes any such possibility very unlikely.

The fact that all snakes are carnivorous and birds largely granivorous, and the further fact that uric acid calculi are frequently met with among teetotal Mohammedans and the vegetable feeders of India, makes it very unlikely that we can control the deposition of uric acid in the tissues by merely withholding certain articles of diet.

Gouty persons are usually depressed and very often come to us asking for "tonics," and saying they are a "peg too low" and want "keeping up." To accede to their wishes is a great mistake and is analogous to heaping coals on a dimly-burning fire, instead of raking out the bars and getting rid of the waste products which prevent free combustion. Gouty patients are often told to eat poultry instead of "butcher's meat," but this cannot be defended on purely chemical grounds, for analysis shows there is very little difference, indeed, in the chemical composition of "white meat" and "red meat." As the picking the bones of a bird is a longer process than the gorging of slabs of solid meat, it is probable that the poultry-eater gets less flesh than the consumer of butcher's meat, and this may be a good thing for him. If, however, the patient translate "poultry" into "boned quails stuffed with foie gras and served in aspic," or similar dainties, he may effectually defeat his doctor's intentions.

Gouty persons are often warned against sugar, and are told on no account to touch fresh fruit, such as peaches, grapes, and strawberries; and, although the restrictions cannot be upheld on any chemical theory having reference to uric acid, there seems little doubt that gouty persons are not tolerant of sugar and sweet fruits.

It is clear that the gouty man must "eat to live," and must avoid pampering his stomach and taking more food than he requires. If he assimilate more than his excretory organs can satisfactorily deal with, his auto-intoxication commences. If his urinary organs be overtaxed, it is no wonder that the most insoluble of the urinary constituents (uric acid) should be one of the first things to be left behind. I would remind you that birds and snakes, in which uric acid is the chief urinary excrement, pass a urine which is semisolid. This is necessitated, so to say, by the comparative insolubility of uric acid, which requires some fifteen hundred times its weight of water for solution, and which is insoluble in alcohol and most acids. It is no wonder that uric acid should be left behind when a competition arises among the candidates for urinary excretion. The greater the amount of material which has to be excreted by the kidneys the greater the likelihood that uric acid will be left behind among other things. It is manifestly important to cut off the pampering extras from the gouty man's diet. Among these extras are the majority of sweet things and fruits, both dried and fresh. If these things were taken as a real part of the meal for the purpose of satisfying a legitimate appetite, the gouty person would soon accommodate himself to his diet, just as do those patients who undergo the "grape-cure" in Switzerland; but when, after satisfying the appetite with soup, fish, entrée, joint, sweet, savory, he continues to sit at the table and amuse himself with "dessert according to season," which he consumes without appetite, he necessarily overtaxes his excretory organs and increases his risk of gouty troubles. The very bad reputation which strawberries have with the gouty is due to the fact that they are an extra tacked onto a diet already too liberal, and that, being cool and soft, any quantity almost can be eaten *without appetite*. Those articles of diet which demand little or no appetite on the part of those who consume them, are very dangerous for the gouty. Sugar is essentially a diet for the young and rapidly developing, who have a natural craving for it, a craving which usually disappears as life advances. By freezing syrups so that the coolness masks the sweetness, sugar is taken by the adult without appetite. The punch *a la Romaine* in the middle of dinner and the concentrated mixture of cream and syrup (called ice-cream) at the end of dinner, are the means of putting a

mass of very strong and concentrated food into the stomach of a man who probably has already eaten more than he requires.

If a gouty man restricts himself to plain simple food, and rigidly avoids all extras, such as dessert, his own appetite is probably his best guide in the selection of food. If he wishes to indulge occasionally in fruit, he should take it as a substitute for pudding or eat it at breakfast in lieu of something else.

Legitimate appetite and the craving for special articles of food is an astonishing fact of probably the first importance, notwithstanding that writers on dietetics are nearly silent on the subject. It is always a dangerous thing to make very sudden and arbitrary changes in the diet of those whose habits of life are formed, and in doing so I think no wise physician should neglect to attend to the clearly expressed likes and dislikes of his patient. In this connection I may mention the case of a singularly hale and hearty gentleman of eighty-seven years, whose dark hair, perfect set of teeth, and boy's appetite were the wonder of his friends and acquaintances. When this gentleman was recovering from influenza and pneumonia, his doctor, finding something in his urine which reduced "Fehling," promptly cut off all the sugar from his diet. But the "old boy" was fond of his pudding, and when the pudding was placed upon the table he always clamored (and successfully) to be served. Thereupon the family entered into a saintly conspiracy in their father's interest to eat no pudding in order that eighty-seven might not be led into temptation. The result of this was that the patient was detected in the pastry-cook's shop wolfing up tarts like a school-boy. This gentleman is now in his ninety-second year, still has a craving for sweet things, and is practically sound in body, very active, and clear in intellect. Undoubtedly in this case the natural cravings for sweets have done him no harm.

Another instance of irresistible appetite has come under my notice in the case of a naval officer who had been many months at sea in a ship in which the fresh meat and tinned vegetables ran out. The men were put upon a daily allowance of lime-juice, but my friend had neglected to take his daily dose. This officer was the pink of good manners and a perfect stranger to the vice of gluttony; nevertheless, when the ship stopped at an obscure port and he took a walk on shore, his eye caught sight, in the window of a general store, of a bottle of "piccalilli" bearing the label of a well-known firm. The sight of the bottle produced a craving, and in a few minutes he had bought the pickles and consumed a large part of them by the aid of a button-hook. This is another instance of the right guiding of the appetite.

Why is it that the whole human race when it has reached a certain degree of civilization has taken to fermented drinks? Why does the whole world use alcohol in some form or another? What is it that has prompted us to cultivate plants which contain an alkaloid which chemists call theine, caffeine, theobromine, etc., according to its source of origin? Finally, what is it that enables my dog to select the "*agropyrum caninum*" with absolute certainty and without any previous instruction in the matter? If we cannot answer these questions, let us remember to be sure of our grounds before we decide that our patients are not to be allowed reasonable scope in the selection of food.

In the selection of the gouty man's drink we have to take care that he gets as little food as possible in the guise of beverages. Thirst is the cry of the blood for water, and for the purpose of slaking thirst water alone is necessary. Unfortunately, water is not popular with those who have become accustomed to the various alcoholic beverages which the human race has used for a good many thousand years. The alcohol which the gouty man takes with his meals may be of use to him by delaying the digestive process in the stomach and putting a slight check upon assimilation. That alcohol is a food there can be no doubt, but, unlike most other foods, it seems incapable of being stored in the body, so that any excess is rapidly excreted by the lungs and kidneys. Uric acid is insoluble in alcohol, and the man who takes an excess of alcohol with his excess of food is more likely to suffer from deposits of uric acid than he who takes excess of food only.

Port wine and strong beer are the types of drinks which undoubtedly favor the occurrence of gout, because they are not only rich in alcohol but in extractive matters or "body" also. The rich alcoholic drinks are really foods in disguise, for they contain, in addition to the alcoholic food which cannot be stored in the body, a large amount of carbohydrate which is stored in the body as the brewer's drayman, fattest and placidest of beings, bears witness. The gouty man's drink must be the thinnest which he can be got to take, and it is now very much the fashion to order a small quantity of distilled drink drowned in mineral waters as a substitute for wine. The effervescing wines, in which there is a large amount of natural and added syrups, are very bad for the gouty, and when they have been made "dry" by the addition of constipating astringents they are not much better. All syrups and liquors must be avoided by the gouty, and it is probable that syrups bring quicker trouble to the gouty man than the raw sugar, which has to be dissolved (more or less slowly) in the stomach.

All the so-called teetotal drinks which are made with syrups are probably as bad from the point of view of gout as beer.

The greatest mistake, however, which the adult can make when he discards alcohol is to fly to milk.

When "he asked water and she gave him milk," we must remember that she was contemplating murder, and we must not forget that milk is one of the strongest foods, if not the strongest, which is within the reach of man. Milk has no right to be regarded as a beverage, and the gouty adult who abandons alcoholic drinks and takes to milk *as a beverage*, jumps, I believe, "out of the frying-pan into the fire." I am not arguing against the use of a milk diet, which is valuable enough in some cases of disease, nor do I object to the use of milk in cookery, but a word of warning needs to be given to those adults who employ milk instead of water for slaking thirst, or, in other words, use milk as a beverage, or, to repeat the expression I have used earlier, take a strong and insidious food *without appetite*.

It has fallen to my lot to see several worthy persons in whom this great dietetic error had produced undoubted symptoms of gout, including deposits of urate of soda. The man whose blood is habitually overcharged gets nervous, gloomy, and apprehensive, almost to the verge of melancholia, and I have seen this condition produced not only in those who are gluttonous and wine-bibulous, but also in those who for conscience' sake have forsworn the pleasures of the table and who have fallen into the error of using milk as a beverage. Milk is a marvellous *food* for children, and upon it they will grow and develop in a way which is simply astounding. Those whose growth and development are at an end cannot digest and assimilate milk as the child can, and the adult who drinks milk instead of water for the purpose of washing down a mixed diet, commits a very dangerous dietetic blunder.

You will have gathered that the great dietetic rule for the gouty is to live on simple food and to be ever on his guard against all those forms of food which we habitually take without appetite. It is doubtful if any rule of life for the gouty can be better than Abernethy's, which was "to live on sixpence a day and earn it." Plain food to satisfy appetite, with plenty of exercise in the *fresh air*, at once checks assimilation and spurs excretion, and these are the indications for treating the gouty.

As regards the treatment of the gouty, next in importance to the diet is to keep the bowels rather freely open. In this way, not only is the nutritive matter kept for a shorter time in contact with the

alimentary tract, but it is also probable that the large intestine serves very considerably as a channel for the elimination of waste products. In cases of poisoning with antimony, arsenic, and mercury, it is certain that much of the poison is eliminated by the large intestine, and it is also probable that in the cases of auto-intoxication which we have been considering, it serves a similar purpose. It is always undesirable to check the occasional diarrhoea which is common in gouty subjects, and equally undesirable to check occasional hemorrhage from piles. For plethoric subjects, the best purgatives are saline aperients or aperient mineral waters, which they take well. For anæmic subjects, it is better to give an aloetic pill with the meals.

When patients go abroad to "take the waters," not only are their habits of life completely altered, but the copious draughts of warm saline waters have the effect of washing the waste product out of the blood. When a patient has been through a London season, rising late, eating and drinking a great deal too much, and spending his time in overcrowded rooms, it is no wonder that he improves when he rises at six, drinks a pint or so of hot saline water before breakfast, lives sparsely and carefully, and spends his whole day in exercise in the open air. Life at these baths is very pleasant, and the *régime* which is necessary is fashionable. Of late the fashion of drinking hot water at home has been advocated, but if a man prolongs this treatment he is apt to become anæmic, flabby, and washed out. The waters which are most in vogue for the gouty are Carlsbad (purgative), Homburg and Kissingen (saline), Contrexéville and Vichy (alkaline), Buxton, Bath, Baden, and Gastein (warm and indifferent).

For the gouty paroxysm, in addition to a saline purgative, colchicum may be given, a drug which has retained its popularity with the gouty for many years, although how it acts towards this end is by no means certain.

I am accustomed to prescribe something like the following:

R Sodii sulphatis,
Magnesii sulphatis, aa ʒss;
Sodii carbonatis,
Sodii chloridi, aa gr. v;
Potassii iodidi, gr. i;
Vini colchici seminis, ℥xv;
Fiat haustus aq. ad ʒi.

Sig.—To be taken every four hours in a claret-glass of hot water.

It is generally admitted that gout may be inherited; and there is no difficulty, on physiological grounds, in accepting the fact that a man

may resemble his parents internally as well as externally. Just as deficiency, redundancy, or peculiarity of external features may run in families, so may similar qualities of internal organs be inherited. We know that certain families have good appetites and fine digestions, while others, to use a phrase of the late Sir Andrew Clark, may inherit "renal inadequacy" with a consequent tendency to gouty manifestations.

On the other hand, it must not be forgotten that "inheritance" may not be of a true physiological kind, but may depend upon an education in luxury and indolence or the inheritance of a large income and a well-stored cellar.

A CASE OF HAY-FEVER; A CASE OF ISCHÆMIC GANGRENE OF THE TOES; AND A CASE OF NEURASTHENIA.

CLINICAL LECTURE DELIVERED AT THE PHILADELPHIA POLYCLINIC HOSPITAL.

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GENTLEMEN,—The case which I shall first bring before you at this the first lecture of the present session is one of considerable therapeutic interest.

Mary D., unmarried, twenty-four years of age, residing at Chester, Pennsylvania, works in a cotton-mill. I call your attention to the fact that she is a hard-working girl, in order to show that there is no element of a pampered life or of excessive mental activity to be considered in the development of the condition from which she suffers. This is rather rare; most cases occur in individuals who are, perhaps, too active intellectually, and many of whom overeat and do not take sufficient exercise. Another point of interest in the case before us is that the symptoms of which the patient complains began when she was a child of seven years. She knows this to be a fact, not only because she has been told so by her mother, but she can distinctly remember that she had to remain from school for some weeks on this account; and as it was her first session at school the incident made an impression upon her. She tells us that her attacks occur periodically, always beginning about the middle of August and continuing until about the middle of September, the duration being four or five weeks.

She first came to this hospital on the last day of August of the present year. She was then suffering severely. The symptoms of which she then complained have now ceased, and she feels very well. She tells us that she obtained relief quicker this year than she did in any previous year, but that the attack neither ceased earlier nor continued later than usual.

The attack sets in like an ordinary "cold in the head," the eyes and nose become inflamed and watery, and then she has sneezing and some cough. This lasts for a period of about two days; then begins wheezing, with a considerable degree of dyspnoea. So marked is the latter, in fact, that she has great difficulty to get her breath, and is unable to lie down,—it is actual orthopnoea. She is unable to sleep. She refrains as much as possible from eating, as this aggravates the dyspnoea and increases her cough, the latter not being sufficient to annoy her at other times. Repeating our question to make sure of the fact, we are again told that on account of the great dyspnoea caused by eating she prefers to go hungry rather than eat, although she has a good appetite. During these attacks there is some little expectoration; the expectorated matter being at first thick, but gradually becoming thin as the attack passes off. The paroxysms of dyspnoea last about two hours, with short intermissions about every twenty minutes of two or three minutes each. She has a feeling as of a constricting band around the midsternum; not around the waist. She has never missed her menstrual period. Menstruation has occurred regularly for about seven years. As stated, the patient appeared here for the first time on the 31st of August of this year, her attack having begun one week before. The paroxysms were more severe than they had ever been in former years, and the dyspnoea more particularly distressing after six o'clock in the evening, rendering sleep impossible. She complained that her eyelids itched very much, and told us that the attack began, as is commonly the case, with itching and burning of the eyes. My own personal experience is that itching of the eyelids, save one,—namely, itching of the palate,—is the most distressing feature of the affection. I do not, however, have the asthmatic phenomena. This patient has changed her residence several times, but wherever she goes the distress follows her. She has been in the mountains around Mauch Chunk, but has never been to the sea-shore.

When the patient first came here she was pale and weak. Physical examination showed her heart to be normal; the chest resonant, but full of sonorous and sibilant râles. There is no history of gout or rheumatism either in her or her family. On examination of her urine there was no excess of urates or uric acid. These points are of some importance in the theoretic etiology of this affection. I have not yet mentioned its name, but the diagnosis is not difficult. You all know what this patient suffers from. It is the complaint which commonly goes by the name of hay-fever or hay-asthma, better termed idiosyncratic coryza or periodic vaso-motor coryza. Hay-fever in this case is

specially a misnomer, as there is no fever in the patient, nor is hay a factor in the causation. On the other hand, it is much more than a coryza.

The treatment that has been used with success in the case before us consisted, first, of a pill of atropine sulphate, grain $\frac{1}{100}$, and extract of opium, grain $\frac{1}{2}$, to be taken as necessary; the indications for taking it being the coryza and the pain, and the indications for stopping it being the production of symptoms of atropinism. Of all the remedies used to relieve the nasal symptoms of hay-fever, there is none, in my opinion, comparable with atropine, which may be used singly, but, as a rule, is more efficacious when it is combined with opium. In my own case, I usually take $\frac{1}{100}$ of a grain of atropine once or twice daily, and this keeps me fairly comfortable so long as I remain away from the country. My attacks occur, not in the fall, as is most common in America, but in the late spring or early summer,—the end of May or beginning of June. Going into the country, and thus exposing myself to the irritation of various pollens, will provoke a paroxysm; but by remaining in the city I can keep very comfortable under the treatment mentioned. Some patients require larger doses than that, and some less. I usually give $\frac{1}{100}$ of a grain, and if that dose produces the symptoms of atropinism, I decrease the quantity, or if it does not control the paroxysms, I increase the quantity, repeating the dose at the end of two, three, or four hours, according to the effect produced. If you can trust to the judgment of the patient, it is better to give him pellets or tablets representing $\frac{1}{100}$ of a grain, and let him repeat the dose sufficiently often to control the symptoms, stopping the drug if it produces dilatation of the pupil, drying of the throat, or flushing of the face. When you cannot trust the patient's judgment, give $\frac{1}{100}$ grain doses, and prescribe two or at most three doses daily.

In addition to atropine and opium, the patient was given a two-per-cent. solution of cocaine for local use in the nose when necessary. Here, again, a word of caution must be given. For the relief of the local distress in the upper air-passages, there is nothing equal to cocaine; and there is nothing more dangerous to trust patients with, unless we warn them thoroughly against the cocaine habit, and can depend upon their self-control. Many persons, and I know of several instances among medical men, have continued to use cocaine by the nostril as an intoxicant, after having done so in the first instance to allay the symptoms of hay-fever. The absorption of cocaine when applied to the upper air-passages is very rapid, much more so than when it is applied to many other parts of the body; and not only this, but the effect upon

the brain seems to be very much greater when it is absorbed from the nasal passages than when absorbed from other parts of the body. This fact is possibly explained by the venous connection between the nose and the brain, allowing of the more rapid and ready entrance of the drug into the cerebral circulation. At all events, the patient must be warned never to use this drug unless it is absolutely necessary, and not to get into the habit of resorting to its use upon slight provocation. Under these limitations, if the patient is to be trusted, a two-per-cent. solution can be used. Stronger solutions than that over-stimulate the contractile tissues, and after a time paralyze them, so that stronger and stronger solutions have to be used, until, finally, they have no effect at all.

In addition to cocaine for occasional palliative use when the atropine failed to relieve the obstructive engorgement of the nasal passages, we gave this patient ethyl iodide for inhalation during the paroxysm of dyspnoea. This, she says, is what has given her the greatest relief from her suffering.

During these seventeen years that she has suffered from this disease she has undergone several different methods of treatment, and never before has relief been so prompt. As a rule, patients think that the last is the best, and we must beware of such a fallacy in the present instance. Miss D. interrupts me to assure us that this is not the case; and my experience in these cases has been sufficiently extended to know, moreover, that the iodide of ethyl gives often what seems to the patient miraculous relief from asthmatic paroxysms. This drug is usually dispensed in half-ounce bottles, which should be amber in color and not blue, as that condenses the actinic rays and decomposes the drug; and it should be kept in a cool place. If an amber bottle cannot be had, the bottle should be wrapped in black paper. Ethyl iodide is used by simply holding the unstoppered vial to the nose or mouth, and inhaling. The heat of the hand will vaporize the drug, and it is very easy to make sure that the patient shall not get an excessive dose. The effect of the iodide of ethyl when it is pushed beyond the medicinal dose is vertigo, and that is a sign to stop. If there is no vertigo the inhalation is continued until relief is experienced, and this varies from two to five minutes. In this case it took three minutes. Cross-questioning confirms the report. A paroxysm, which usually lasted two or three hours, was cut short in three minutes, and the patient was sure of getting relief by resorting to the inhalation. She therefore permitted herself to eat, and she was able to sleep.

There we have positive therapeutics. But one cannot always get

this result. When the iodide of ethyl fails, I usually combine with it an equal part of chloroform, and direct that the mixture be inhaled in the same way. If this fails, and in very severe cases, I would not hesitate to push the chloroform to complete anæsthesia. It is not often necessary to do that, but personally I would have no hesitation in taking the chloroform to anæsthesia if I could get relief in no other way.

The other treatment, of course, is hygienic. The patient's bowels must be kept freely open; the secretions must be all kept a little above par,—that is, one must drink more water than customary, and pass more water than is usual, that the various toxins that may have accumulated may be washed out; and, above all, we must avoid overloading the stomach, as that is provocative of a paroxysm.

I should not omit to state that we did a little nasal treatment in this case. We referred the case for examination to the clinic of Dr. Watson, who found the turbinates greatly engorged, and lightly cauterized them to reduce that engorgement.

When a hay-fever patient has a nasal abnormality, proper treatment will reduce the severity of the attack. As a treatment for hay-fever, without nasal abnormality, I do not favor cauterization, whether "superficial" or deep. In some cases it gives temporary relief, but the net result is to fill the patient's nasal chambers with scar-tissue, which in its contraction presses upon the normal tissues, and finally causes their absorption, producing a condition of atrophic rhinitis which is very difficult to relieve. I am, therefore, unalterably opposed to the use of the galvanic cautery in the nasal passages as a measure for the amelioration of the symptoms of hay-fever. As a surgical measure for any abnormality it may be used in a hay-fever patient as it would be in a patient who is not thus affected.

This patient comes back to-day complaining of a form of paroxysm which is extremely rare in hay-fever cases, and which is not usually recognized as belonging to the hay-fever syndrome, and that is a gastric crisis. I cannot say whether or not the efforts made for the relief of the pulmonary crisis have caused the gastric crisis by derivation. It is possible in neurotic affections without anatomic lesion for morbid energy to be diverted from one part of the system to another. On looking over the history, however, we find recorded a certain tendency to gastric crisis, as it is said that during the attack, always after taking food coughing begins and the dyspnoea is increased. To-day, with cough but without dyspnoea after eating, there is a sensation of burning of the chest, above the epigastrium, which lasts for about a half hour.

She has not had these attacks before, and I think we can relieve them very readily. We shall direct her to drink a half pint of hot water one-half hour before each meal, and also to take a half teaspoonful of sodium bicarbonate immediately before eating. The burning is probably due to an excess of acid in the stomach, caused by an erethitic condition of the neuro-glandular apparatus. If so, this treatment will relieve it, soothe the stomach, and permit recovery. The bowels are to be kept thoroughly open with some simple purge, as Rochelle salt or magnesia.

I should have added to the patient's history that on employing the usual tests we find that she has that condition of vascular erethism which I have named vaso-motor ataxia. So that in this case, as in all cases of hay-fever, we have, as an underlying condition, a peculiar irritability of the vaso-motor system. Not every one who is exposed to the inhalation of pollen, or other irritants that are found to produce these symptoms, has hay-fever; but only those who have this vaso-motor condition are affected.

Dr. John Mackenzie's proposed name of periodic vaso-motor coryza expresses the disease fairly well, but to have it all we should have to add to the coryza, asthma and gastritis, and probably in the next case that would turn up there might be some other prominent symptom. The name proposed by Dr. J. Solis-Cohen, idiosyncratic coryza, explains it without limiting the disease.

Three elements are necessary to produce hay-fever: two intrinsic, one extrinsic. The two belonging to the patient are an erethitic vaso-motor condition and a special sensitiveness of the nasal mucous membrane or the conjunctiva. The third, exterior to the patient, is the exciting cause; a species of pollen varying with different individuals, the attacks recurring with the development of that pollen.

CASE II.—Here is another rather peculiar case, and one of considerable interest.

R. J., aged forty-five, a tailor by occupation, operates a sewing-machine. He was born in Roumania, and has been in this country eight years. Except syphilis, he had no sickness before coming to America. In the winter of 1891 and 1892 he was working as a tailor. About this time he had some family trouble which affected his mind profoundly. Soon after this he began to have considerable pain in his right knee. The pain was paroxysmal, and he compares it to that of a needle sticking in the knee. Paroxysms became more and more frequent. There was also some rigidity in the calf of the right leg, and he was compelled to cease work to obtain relief. In the following

spring, while walking on the street, he was suddenly seized with pain in the calf-muscles, and was compelled to stand still for about five minutes; then the pain having ceased he proceeded for two blocks on his way, when the pains returned and were as great as before. From this time on paroxysms of pain continued to be excited in the right leg by the slightest use of it in walking. In July, 1892, in addition to these pains, he had a biting sensation in the right foot, with pain running up the leg. This pain continued to increase until October, 1892, when the right foot became cold and was dark-blue in color. He then went to a hospital in this city, where it was found that the third toe was gangrenous. The toe was amputated, and a few months later the metacarpal bone was excised on account of necrosis. Some months later similar phenomena recurred. He went to another hospital, where the great toe was amputated after a consultation of all of the surgeons of the hospital. When he first entered the operation was considered to be too dangerous to be done at once, and was postponed for some time. During all this time he had suffered severe pain in the foot and leg. The wound from the latter amputation was eight weeks in healing. Indeed, it never healed completely, for when he entered this hospital on July 3 of the present year, the line of operation on the great toe was still gaping about one-third of an inch. He was then complaining of pains in the left leg similar to those he had previously suffered in the right leg, and which had preceded the gangrene in the right. This is the point to which I wish to call your attention, and a point which I hope you will bear in mind as one of considerable importance in predicting the approach of gangrene in a young person. Paroxysmal pain, cramps, and rigidity of the muscles of the limb are warnings of impending gangrene, and measures must be taken to avert it.

The treatment under which we placed this man was, first, absolute rest in bed; second, the application of heat to the affected leg; and, third, the administration of trinitrin to relax the arterioles.

The cause of the pain and the gangrene was the cutting off of the arterial blood-supply. That cutting off might be due to vascular spasm, as in Raynaud's disease; or it might be due to a mechanical cause, as a thrombus, or to an aneurism of the aorta, or to pressure over the iliac or femoral. I do not think that the case is one of Raynaud's disease,—not because it occurred unilaterally in the first instance, for "symmetrical gangrene" is a misnomer as a synonym for Raynaud's disease. I have myself seen one instance of unilateral Raynaud's disease with gangrene of the toes, and others are on record. But the his-

tory of the case is different from that of Raynaud's disease. The long prodromes, the pain affecting the calf of the leg, the gradual onset of the local discoloration and gangrene, and the evidence discovered of local obstruction to circulation, justify us in excluding that affection. I say evidence of local obstruction. I must not be too positive, however. We found no evidence of aneurism, and no obstruction in the femorals ; but we did have difficulty in mapping out the position of the arteries of the lower part of the leg and of the foot. There is evidently some obstruction, the nature of which is not clear. We presume from the history of this patient, and from the analogy of other cases, that there might be a luetic endarteritis, with blocking of vessels and spasm. We therefore, in addition to the nitro-glycerin to relieve the spasm, gave potassium iodide. We began this latter by giving fifteen grains daily, and gradually increased to sixty grains daily. Under this treatment not only have the pains in the left leg disappeared permanently without any signs of gangrene, but the wound in the right foot, which had heretofore resisted all efforts at closing, has almost completely closed. We shall continue giving the nitro-glycerin and the potassium iodide in smaller doses for some weeks. We shall keep the foot and ankle wrapped with wool and use the descending galvanic current on the limb. This treatment may seem to you complicated. It is, for I think the case is complicated. At first I believed that we were dealing with a case of Raynaud's disease, but on further investigation I could not confirm this opinion. I still believe that there is an element of arterial spasm ; but, instead of this being due to an underlying neurosis or a vice of the constitution, it is due to the irritation of a specific endarteritis. The pathological conditions—not necessarily the etiological factors—closely resemble those of angina pectoris. The leg pain and muscular rigidity are quite comparable to the cardiac pain and rigidity of the latter affection.

The evidence seems to indicate that the treatment instituted in the case before us has succeeded in averting the development of gangrene in the left foot ; but we shall warn the patient to keep under observation.

Since studying this case my attention has been called by our chief of clinic, Dr. Riesman, to similar cases reported by Mr. W. G. Spencer in the Westminster Hospital Reports of 1891, in which there had been, as premonitory symptoms of gangrene, practically the same symptoms as are present in this case,—tingling, pain, cramps, and rigidity.

CASE III.—This is another peculiar case. This man has tremor of the head and of the hands. Twelve years ago he had an attack of what was called congestion of the brain, and for the past ten years he

has gradually been losing strength in his limbs, and has a sense of numbness in them ; he has a sensation of tightness in the epigastrium ; there is much pain in the back ; his eyesight is good ; his knee-jerk is a little exaggerated. The pupils respond well to light, but poorly to distance. All the symptoms are increased after exertion. The pain in his back is so bad that it is very difficult for him to bend over and straighten up ; and it also disturbs his station. He is easily disturbed ; the slamming of a door makes him feel shaky and weak. He has never drank alcohol to excess, and denies venereal trouble. He is a gripman on the cable-cars, but these symptoms were present before he was so employed, though they have become much worse since he has been at work.

This man has been to many hospitals, and has seen some of the best physicians of the city, and has not been relieved by any treatment. At times he has felt a little better for a day or two, and then worse. He has been cupped and he has been cauterized ; he has had rest-treatment and gymnastics, and all the drugs of the pharmacopœia. His bowels have been regulated and proper diet prescribed. His urine is very acid, clear, containing no sugar, no albumen. His blood-count is normal. The eye-ground is normal.

After carefully examining and studying this case we were unable, as those who had preceded us had been, to find any evidence of organic disease. It is not paralysis agitans, and the long duration is against cerebro-spinal sclerosis, or any grave cerebral or spinal lesion. The distinctive symptoms of Graves's disease—often a cause of tremor—are wanting. We find simply a condition of weakness of the nerves, and while there is a tendency to vascular spasm and irregular cardiac action, yet it is not marked ; it indicates merely that the vaso-motor nerves are as weak as are all the others.

I do not know of any better name that could be given to this case than that of neurasthenia, nerve-weakness ; and I may say that I do not remember ever having seen a case to which I was equally willing to apply this name.

The rest-treatment is the one above all others of value in cases of this nature ; but he was under rest-treatment for three months at the very home of that treatment,—the Orthopædic Hospital. We may, therefore, conclude that rest-treatment has failed in his case ; for if he can get that treatment anywhere in the world, in all its details, he can get it at the great hospital mentioned. The rest-treatment often fails because it is not properly applied ; it requires careful attention to the minutest details, and skill, and determination, and persistence, and tact,

and wisdom, and experience on the part of the nurses and physicians. In this instance none of these was lacking. The patient admits that he was benefited for the time ; but as soon as he came out of the hospital his trouble returned, and he is now worse than before. After hearing all the drugs and all the methods that had failed to cure our patient, it seemed that there were but two therapeutic expedients left to us : one was the injection of Brown-Séquard's fluid—testiculine, as some call it. I used this because a very eminent authority in this city told me recently that he had seen good results from it in locomotor ataxia, and in cases of nervous exhaustion. This man has received injections of thirty minims of a trustworthy preparation of testicular fluid three times a week for three weeks, but has felt no better. There is but one of two conclusions to be drawn : either that he did not get a big enough dose, or that he will not improve under this treatment. Before giving it up I should like to increase the dose to sixty minims. If that fails we shall use calcium glycono-phosphate. This drug is thought by some observers to be the real remedial agent in testicular fluid, and before abandoning the "nerve-food" line of treatment we shall try it. If there is a case in which it ought to do good, this is certainly that case. The other expedient kept in reserve is hydro-therapeusis,—the use of water by cold douching to the spine, or other method. I confess to more hope of a good result from that than from the testicular therapy.

COLD IN THE TREATMENT OF ACUTE PNEUMONIA.

CLINICAL LECTURE DELIVERED IN THE PHILADELPHIA POLYCLINIC.

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GENTLEMEN,—The therapeutics of pneumonia is in what may be called an unsatisfactory condition. There is neither unanimity nor precision of purpose in the minds of medical men as to what is best to be done for this disease. This is all the more surprising when we reflect that it is one of the oldest diseases known to medicine, and one in which no difference of opinion prevails in regard to its pathology. Forty or fifty years ago pneumonia was looked upon as being one of the most typical of inflammatory diseases, and the most active antiphlogistic treatment was adopted to overcome it. Venesection was practised to the point of syncope, while calomel and tartar emetic were administered internally and blisters were applied externally. In time it was found, however, that the results which were obtained from this mode of treatment were not as good as those which were gotten by the homœopathic practitioners of that period. This proved to be a wonderful stimulus to the growth of homœopathy: but it was bound to be short lived, for Dietl, an Austrian physician, found that the expectant, or the let-alone, plan did more in pneumonia than any other form of treatment which had been in use up to that time. It remained, however, for Dr. Hughes Bennett to show that if the expectant plan is combined with good feeding, better effects are obtained than by any other method. While bleeding and blistering have been relegated to the past, where they properly belong, they have been displaced by hot poultices, aconite, veratrum viride, belladonna, and other agents, of which it is not too much to say that, like their predecessors, they have come to grief in the retort of clinical experience. Indeed, I believe it can be safely said that no real and distinct advance has been made in the treatment of pneumonia since the days of Dr. Bennett until up to quite a recent date.

It is my opinion that this step of progress in the treatment of this

disease is chiefly, if not entirely, due to the application of cold to the chest ; and, although this is by no means a new procedure, it has not yet received that extensive introduction to the medical profession of this country which it deserves. Cold has been applied in the treatment of pneumonia by the Germans for a long time, and so far as I know the great Niemeyer was one of the pioneers in this line of practice. A great deal of difference of opinion exists in regard to the action of cold, and to the manner in which it should be employed. Much of this depends on the pathological view which is held of the disease. If one believes with Jürgensen that the disease is a constitutional one, and that its chief danger arises from the high fever which finally leads to cardiac failure, then his principal aim naturally is to reduce the fever at large, and to support the heart, and he accordingly gives his patient a periodical bath in cold water, or uses cold spongings freely, and administers heart-tonics. On the other hand, if it is held that the local trouble in the lung is responsible for the elevated temperature, attention will be drawn from the general condition of the body, and will be centred more on the chest, and under these circumstances the cold will be applied directly to the inflamed lung, as was first advocated by Niemeyer, I believe.

Probably much of the ill success which has followed the use of cold in pneumonia is due to the fact that it has been employed in the form of baths or spongings. While the cold bath has proved eminently successful in, and has revolutionized the prognosis of, typhoid fever, yet from my experience in the treatment of pneumonia I do not believe that the pyrexia of this disease is of a similar nature to that of typhoid fever, nor that it yields to cold applied in the same way as that of the latter. It appears that the fever of pneumonia is best subdued by cold in the form of ice being applied directly over the lung, or part of the lung, which is affected, and not by general baths or by spongings. It is just here where the strength and value of the remedy lie. The fever is undoubtedly largely due to the inflammatory disturbance in the lung, and it is evident that any measure which abates the pulmonary disorder also strikes at the very root of the difficulty, and brings about an amelioration of the whole condition of the patient. This is the way in which the ice accomplishes its good results,—not through its general, but through its local influence. Half-way measures will, however, not suffice here, and hence the cold must be applied continuously and persistently.

How is the cold to be applied ? In the first place the ice must be broken in pieces small enough to go into a flat wide-mouthed rubber

bag. The ice-bag is wrapped in a towel and is placed against the affected area ; and if the patient is restless, and there is trouble in keeping the bag in place, it is advisable to surround the patient's chest with a broad bandage or towel, and fix it. If the pulmonary disorder is confined to the front base on one side only, one bag will answer the purpose ; but if it extends to the side and back, at least one more bag must be applied laterally, and as far back as possible. If the affection is extensive, put on as many ice-bags as are necessary to cover the whole area. I have had as many as eight ice-bags on the same patient at one time. It is always of great importance to watch the morbid process, for it is apt to migrate sometimes from one spot in the chest to another, and if this is the case, follow it up with the ice-bags.

How long must the cold be applied ? In most cases this is governed by the amount of fever which is present. If this falls to or near the normal point, and shows a tendency to remain there, the ice may gradually be removed. Great care must be exercised, however, in doing this, for frequently before this is off very long the temperature flies up to as high or nearly as high a point as it was before. This is an error which could have been avoided by either withdrawing the ice more slowly or by allowing it to remain longer. I know that when the fever drops to near the normal point, the fear of depressing the temperature too much takes hold of the attendant, and is a great temptation to throw the ice to one side. I believe, however, that the premature withdrawal of the ice is more detrimental to the patient than the injury which it is possible to inflict by keeping it applied too long. It happens, sometimes, that the temperature suddenly flies up while the ice remains in contact with the inflamed area. When this occurs there is no reason to suspect that the process has lighted up freshly in the area, the inflammatory activity of which had been reduced by the ice, but rather that the engorgement and exudation have extended their field of operations and invaded another lobe, or part of a lobe.

In this connection it is interesting to call attention to the fact that the ice is not employed for the sole purpose of reducing the pneumonic fever, but with the idea of conquering the local process and of hastening resolution in the affected part. It is well known that in some cases of pneumonia, as in the aged, for example, there is no, or very little, fever present, yet the destructive changes in the lungs are going on at a rapid rate. In senile and latent pneumonia the activity with which the ice is applied must, therefore, be governed entirely by the impression which is being made on the pulmonary disintegration. This must be the objective point, and not the fever in such cases.

This leads us to the point of inquiring into the value of fever as a prognostic sign in acute pneumonia. Is a high temperature of graver import than a low one, or is the reverse true? It is, of course, universally conceded that a temperature of 107° or 108° F. is excessive, and almost necessarily fatal; but it must also be admitted that a markedly low pneumonic temperature is equally perilous, hence safety lies somewhere between these two points. But is the point of safety near the upper or the lower line? If other things are the same, I think it may be taken for granted that a low temperature in pneumonia is of more serious import than a high one within the above-indicated limits. Fever is an expression of the degree of vital resistance which is present in the body, and if its curve does not ascend above 105° F., the prognosis is good; but if it either goes up very high, as in hyperpyrexia, or very low, as in the pneumonia of inebriates, it is evidence of serious exhaustion, and a warning that the vital forces are inadequate to cope with the destructive process.

This view is partly indorsed by the high authority of Dr. Wilson Fox,¹ who shows that out of a total of three hundred and fifty-three cases of pneumonia the mortality was one hundred per cent. when the temperature ranged between 107° and 110° F.; 42.8 per cent. between 106° and 107° F.; eighteen per cent. between 105° and 106° F.; 7.4 per cent. between 104° and 105° F.; 17.6 per cent. between 103° and 104° F.; and 36.9 per cent. below 103° F. Commenting on these results, Dr. Fox states that apparently "the maximum of safety *as regards the temperature* is between 104° and 105° F.; that below this standard, as well as above it, the mortality increases; and as regards the next two stages (105-6° and 103-4°) the death-rate is nearly equal; while that below 103° F. is only, comparatively speaking, slightly less than the excessive temperatures ranging from 106° to 107° F."

What, then, is the action of cold on the inflammatory process of the lung? Pathology teaches us that in this condition the pulmonary capillaries are greatly dilated and distended, and that the blood which they contain is either at a complete stand-still or circulates very imperfectly. In consequence of this fulness the serum of the blood is forced through the distended walls of the capillaries, and deposits itself in the air-cells of the lung. Indeed, it seems as if the original trouble in such an affected area resided in a sudden over-distention of the pulmonary capillaries, and it furthermore seems that any agent or influence which possesses the power of turning up these vessels, and of bringing them

¹ Diseases of the Lungs and Pleura, p. 352.

to their normal dimensions, would also strike at the very root of the difficulty. Whatever weight may be attached to these impressions, it is quite certain that cold has the power of contracting blood-vessels, and from this it is clear why it should have a beneficial action in this disease. I am quite convinced that cold properly applied checks the further spread of pulmonary congestion, and, furthermore, I have grounds for believing that it produces resolution in areas which are in the stage of exudation. How it affects the latter result is not quite evident to me, although I have seen it brought about on a number of occasions. Take, for example, a pneumonic area which gives the absence of all vesicular sounds, and the presence of a flat percussion note and bronchial breathing,—indicating beyond doubt that the process has passed beyond the stage of engorgement, and into that of exudation or infiltration,—and apply the ice over it, you will in a comparatively short time develop a new group of physical signs, such as crepitation, reappearance of the vesicular murmur, diminution of bronchial breathing, partial suppression of flatness, etc. This metamorphosis of physical signs has been seen by others, notably by Dr. Lees,¹ who has had a very large experience with cold applications to the chest in pneumonia, when he says, “In many cases I noticed a striking arrest in the development of the physical signs, and that the ice-bag distinctly tends to repress the inflammatory process in the lung.”

The question is often asked whether the ice is as applicable in acute catarrhal pneumonia as it is in croupous? I think this question may always be answered in the affirmative, although on theoretical grounds it should be more effective in the latter than in the former variety. Practically, however, it is available, and does good service in both forms. In the catarrhal pneumonia which follows measles or grippe it is of great value. The same is true when it is applied in the capillary bronchitis of children. But when we come to use it in chronic catarrhal pneumonia the case seems to be entirely different. I have tried it in a few with good, but in a larger number with indifferent results, and in some with positive injury, and I must confess that when I do test it in such cases I always do it with a great deal of apprehension and distrust, until I see it yield real evidence of benefit. We must not forget, however, that the ice-bags were strongly recommended by the late Dr. Brehmer, of Görbersdorf, and also by Dr. Dettweiler, of Falkenstein, in Germany, and by others, in the treatment of pulmonary phthisis, though I think more for the purpose of subduing the overaction of

¹ Lancet, November 9, 1889.

the heart, which is present so frequently in this disease, than for any influence they may have directly on the morbid condition of the lungs.

The question of age also comes up in relation to the use of ice in this disease. Is it suitable for all ages, or is its usefulness limited in this respect? It has already been stated that infancy is no bar to it, and so far as my experience extends old age does not forbid its application.

Now, what is to be said in regard to the heart in pneumonia? One hears a great deal about this subject at the present time. Indeed, from some of these expressions it really seems as if the heart, and not the lung, is the organ which is chiefly implicated in this disease, and as if death is due to heart-failure and not to pulmonary exhaustion. No one will, I think, be rash enough to say that the heart is as strong as it was before the onset of the disease. This would manifestly be impossible, on account of the intimate relation which exists between the pulmonary and the respiratory organs; but the doctrine which teaches that pneumonics die because the heart is unequal to the task of forcing the blood through the congested lung is not only nonsense of the sheerest kind, but mischievous to a serious degree. It is unquestionably true that the heart is seriously embarrassed on account of the pulmonary obstruction, but the practitioner who is guided by the theory that the heart is able to overcome this obstruction if its propulsive power can be maintained, will naturally administer digitalis and other heart-tonics in large doses, in the hope of accomplishing this object. His attention is concentrated on the heart and withdrawn from the lungs, where the centre of the disease's activity is going on, and without doing anything directly to allay the primary disorder, he contents himself with the belief that by supporting the circulatory organ he is doing the very best that can be done for his patient.

Is not this sort of therapeutic reasoning mistaking the effect for the cause? Is it not an effort to mend something which is actually very little out of joint except in a passive way? It is a great error to believe that the treatment of pneumonia resolves itself into the simple problem of whipping up the heart; but it is rather a question of removing the engorgement and exudation in the lung, and of thus indirectly freeing the heart from its entangled situation. All this is accomplished by the ice. This agent not only lifts the blockade in the lung, as has been said already, but it lessens the work of the heart, reduces the frequency of its movements, and invigorates the force of its contraction.

The local effects of the ice are not any more remarkable than is its

influence on the prominent symptoms of this disease. The temperature begins to fall in a very short time, and in some cases makes a very rapid descent. I have seen it fall two or three degrees in the course of ten or fifteen hours, and what is more interesting than all is that a decline of this kind is very rarely followed by a rise, if the ice is assiduously kept in place. The pain in the chest, the laborious breathing, and the cough are alleviated, and often to such a degree that it compels those who rebelled against its use in the first place to give a favorable opinion of its effects. In most of my own cases I noticed that the prompt removal of many of the most distressing symptoms was a strong recommendation of the remedy, and served to dislodge any prejudice that may have existed.

Has the ice any injurious effects? So far as my experience goes I can say that I never found any detriment from it whatever. The same testimony comes from all those who have used it. Among these is Dr. Lees,¹ who says, "I have never seen any harm follow the employment of the ice-bag in pneumonia." Dr. W. Fred. Jackson, of Brockville, Ontario, who has used ice in the treatment of this disease for a number of years, is of the same opinion.

It must not be inferred from what has been said that other treatment is useless in this disease. Next to ice, strychnine is probably of the greatest importance. This must be given in large doses both by the mouth and subcutaneously. Begin with one-twentieth of a grain by the mouth not less often than four times a day, and fortify this with one-twentieth of a grain combined with one-eighth of a grain of morphine at bedtime. These doses of strychnine must be gradually increased until the limit of toleration is reached. In the pneumonia of alcoholics larger doses than these indicated above must be given from the very commencement of the treatment. When symptoms of cyanosis or of coma manifest themselves, oxygen must be given without stint by inhalation. Fresh expressed beef-juice, two ounces every three hours, and at least half a glass of milk during the interval, are also to be given. Alcohol, in the form of brandy or whiskey, is also useful.

What now can be said of the practical results of this mode of treatment? Does it show anything better or worse than the methods in common use? In order to learn this, let us inquire into the ordinary death-rate of this disease. According to Osler, the mortality-rate of one thousand and twelve cases treated in the Montreal General Hospital was twenty per cent., while in the Charity Hospital of New Orleans it

¹ *Lancet*, November 2, 1889, p. 894.

was 20.01 per cent. Of one thousand cases treated in the Massachusetts General Hospital, from 1822 to 1889, the death-rate was twenty-five per cent. In Dr. Hartshorne's excellent article on "Pneumonia," it is estimated that about thirty-one per cent. of pneumonics died in the Pennsylvania Hospital during the years 1884, 1885, and 1886. I think these institutions with a death-rate varying from twenty to thirty per cent. fairly represent the current mortality of this disease, and when these figures are compared with a death-rate of 2.70 per cent. obtained in the seventy-four cases which were treated locally with ice-cold applications, and which I collected recently,¹ it will be seen, at least from this limited number of cases, that greatly superior results are obtained from the latter method of treating this disease.

¹ See *Medical News*, June 24, 1893, and October 13, 1894.

THE TREATMENT OF SOME FORMS OF GASTRO- INTESTINAL DERANGEMENT.

CLINICAL LECTURE DELIVERED AT THE POLYCLINIC HOSPITAL.

BY AUGUSTUS A. ESHNER, M.D.,

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GENTLEMEN,—The subject that we shall consider may appear trite and commonplace, but I have selected it because of the frequency with which the affections included in it are encountered in general practice. The ordinary ambulant patient presents symptoms, as a rule, rather of a functional than of a grave organic character, and, while the treatment is not always satisfactory, it is sometimes attended with results almost brilliant. For ordinary practical purposes we may consider the most common forms of derangement of the intestinal tract as catarrhal conditions, involving more especially the stomach on the one hand, or the intestines on the other, but more commonly both conjointly.

Let us, then, begin with a consideration of the catarrhal condition of the stomach, gastric catarrh, acute, subacute, or chronic. I prefer to use these designations, leaving out of consideration for the present the forms of acute inflammation of one or several coats of the stomach. The conditions that give rise to a catarrhal state of the stomach are almost without number. The commonest comprise inadequacies or excesses in quantity or imperfect or unsuited quality of the food, extremes of temperature of ingested material, haste in eating, with imperfect mastication and bolting, irregularity in the hours of taking food, the ingestion of too large quantities of liquid with meals, and certain, not always traceable, reflex influences. As intimated, the symptoms may appear in an acute, a subacute, or a chronic form. They are likely to be acute when due to some intensely exciting and unusual cause, subacute when the cause is less intense and more customary, and chronic when the abuses have been long persisted in, and either are slight in character or a certain tolerance to their irritation has been established.

The symptoms in these several conditions vary more largely in degree than in character. The most common are nausea, vomiting, heaviness after food, more or less protracted, abdominal distention, eructations, regurgitation of liquid, sometimes pain, coated tongue, offensive breath, and bad taste in the mouth. Sometimes there are in addition headache, disturbed sleep, and vertigo. Rarely, if ever, are the symptoms, as well as the lesions, confined to the stomach. As a rule the intestine shares in the disturbance, the same influences acting by continuity of structure. When the intestine participates notably in the affection, there are added increased distention and flatulence, borborygmi, pain, constipation, or diarrhoea, together with an aggravation of the systemic and constitutional manifestations. The symptoms are ascribable, speaking in a general way, to interference with the normal secretions of the parts, to the excitation of morbid secretions, to deranged motility, and to fermentative processes in consequence of inhibition of normal digestion, and the activity of micro-organisms of various kinds. The local manifestations are due to the changes directly occurring within the digestive tract; the constitutional symptoms to the absorption of noxious agents generated as a result of this morbid activity. The derangement of the functions of the stomach and bowels is further attended with derangement of function in the related glandular apparatus, the liver and the pancreas. These several changes must be constantly borne in mind in the management of a given case, and in the selection of the appropriate remedies. In any case the removal of the recognized cause is, as a general principle, to be effected. Much good will be accomplished by insistence upon both general and local rest. If the condition be due to atonicity, stimulating remedies will be indicated; if, on the other hand, to overaction and irritability, sedatives.

Let us first consider the more acute cases. After the ingestion of an unduly large meal, containing perhaps food of an indigestible character, the patient may be seized with nausea, vomiting, pain, and other symptoms already detailed. If the contents of the stomach have not been entirely rejected, this evacuation is to be encouraged, either by the ingestion of tepid mustard-water, or the introduction of the finger into the throat, or the administration of say ten grains of powdered ipecac or a teaspoonful of the syrup, or of a subcutaneous injection of about one-sixth of a grain of apomorphine. In suitable cases the stomach-tube may be employed for this purpose. The patient is to be kept in bed, in a cool, dark, quiet room, permitted to suck bits of ice to allay thirst, and, if there be pain, turpentine stupes, a mustard-

plaster, or some form of dry heat applied to the abdomen, and small quantities of milk, from four to six ounces, administered about every three hours. This last is best given boiled, and with the addition of lime-water, one or two tablespoonfuls to each glass. If there be constipation, as there may be, this may be relieved by an enema of simple hot water and soapsuds, or with the addition of an ounce or so of sweet oil or castor oil. If there be diarrhoea which does not yield to the use of boiled milk and lime-water, bismuth in some form may be employed : the salicylate in doses of five grains every two or three hours, or the subnitrate or subcarbonate in doses of from fifteen to twenty grains at the same intervals. Salol may be given in doses of from three to five grains every three hours. Opium in any form would only be required if the irritability were intense and associated with great pain. For the pain codeine often proves efficacious. If the vomiting be excessive, cocaine, in doses of from one-eighth to one-quarter grain, or cerium oxalate, in doses of five grains, may be employed.

Cases like that just cited are ordinarily manageable if the primary irritation has not been of inordinate intensity and if the general and specific measures indicated are capable of execution. But acute cases of such intensity are, as a rule, not seen in ordinary ambulant practice. In these conditions the cases are almost all of a subacute or chronic character. For a case of this kind, in which there exists, let us say, nausea with little or no vomiting, with distress after food and eructations and constipation, I should give, preceding nourishment, a powder containing from one-twelfth to one-tenth of a grain of powdered ipecac, from one-sixth to one-fifth of a grain of mercurous chloride, and from two to five grains of sodium bicarbonate, repeated at intervals of about three hours, at the same time restricting the diet as nearly as possible to milk, in this instance uncooked if palatable, and without lime-water. Recovery would here also be favored by rest in the recumbent posture. In accordance with the degree of constipation, a saline laxative, such as magnesium sulphate, or potassium and sodium tartrate, or sodium phosphate, a teaspoonful or more, may be administered at the outset, or on the following morning, or even three or more times daily.

Relief will often follow these simple measures, but the morbid tendency has yet to be removed. The solution of the problem lies in the regulation of the diet, the direction of suitable exercise, adjustment of the mode of living, and the administration of a prescription containing from three to five drops of nitro-hydrochloric acid and from seven to ten drops of tincture of *nux vomica*, well diluted, before each meal. Some care must be exercised in the preparation and pres-

ervation of this combination, as it is explosive under certain conditions. If constipation be a troublesome feature, it may be overcome by the continued administration for a variable period of a minimum quantity of sodium phosphate, in a generous amount of hot water, before each meal, until it insures one daily evacuation of the bowels. Given in this way, the phosphate acts as a detergent, as an antacid, and as a gentle laxative, and is often capable alone of effectually relieving many mild cases of chronic gastro-intestinal catarrh. If in such a condition of chronic gastro-intestinal catarrh a more stimulating laxative be required, I prescribe the following combination, which I have found of extreme utility :

Aloin, from 2 to 3 grs. ;
Tinct. of nux vomica,
Tinct. of belladonna,
Tinct. of physostigma, aa fʒii;
Fluid extract of cascara, fʒvi.

Of this mixture is to be taken thrice daily before meals the smallest quantity—usually twenty or thirty drops at first—that is sufficient to secure a daily evacuation of the bowels, and this dose is gradually reduced drop by drop until the habit of a daily unaided movement is established. If for any reason it seems desirable to add to the tonic qualities of this formula, the total quantity may be brought up to three ounces by the addition of a sufficient quantity (fʒiiss) of fluid extract of erythroxylon. If pain, referable to the digestive tract, be a source of complaint, the fluid extract or the tincture of cannabis indica may be added, in doses of five drops of the former and ten drops of the latter. In a word, the prescription may be modified or amplified in various ways to meet specific indications. The most serious objection to this combination, which I have used very largely for a number of years, is its extremely disagreeable taste, but I have rarely, if ever, found adult patients either unable or unwilling to submit to it. Given in any other form,—*e.g.*, in pill or in capsule,—the important feature of reducing or otherwise varying the dose would be lost.

If, in connection with intestinal catarrh, diarrhoea be a conspicuous manifestation, this is to be overcome by various measures, the simplest of which is first employed. For this purpose bismuth subnitrate or subcarbonate in large doses (gr. xxx), or the salicylate in smaller doses (gr. v-viiss), or salol in corresponding doses, may be employed. I have, however, not found these so successful as an astringent combination consisting of extract of hæmatoxylon five grains, aromatic sulphuric acid from five to ten minims, and paregoric sufficient to make a tea-

spoonful, given every two or three hours if the bowels are moved that frequently—the interval being regulated by the frequency of bowel-movement. In some instances the irritability is so pronounced that either a small liquid movement or an ineffectual effort at stool follows the ingestion of anything whatever, liquid or solid. In these instances I have found the administration of from two to five drops of the deodorized tincture of opium with two or three drops of the official solution of potassium arsenite to act most happily. In other instances a combination of one-eighth of a grain each of silver oxide and extract of belladonna has seemed to act like magic. Sometimes such an irritable condition is associated with the presence in the bowel of large amounts of inspissated and impacted fecal matter. Under these circumstances large enemata afford the greatest relief. In cases in which, by reason of a sense of heaviness after food, long protracted; with the presence in the stools of undigested food, there is reason to believe that pepsin is deficient in the gastric secretions, the administration of the official solution of pepsin answers a useful purpose. In some cases palpitation of the heart is an extremely distressing manifestation, and auscultation may disclose cardiac arrhythmia. This, as a rule, yields to the administration of either strychnine or nux vomica, alone or in combination with a mineral acid. Rarely it will be found necessary to administer for a brief period digitalis in sufficient quantity to regulate the action of the heart, which is disturbed largely by the pressure exerted by the distended stomach, and probably in part also by reflex action through the pneumogastric nerve. The mental depression and the hypochondriasis often present yield, as a rule, to the general measures adopted. Sometimes a pill containing

Quinine, gr. ii;
Reduced iron, gr. i;
Strychnine, gr. $\frac{1}{10}$;

or the elixir of quinine, strychnine, and iron, f3i t.d., given after meals, will be serviceable in this connection.

In many cases of intestinal catarrh, particularly in those who lead an inactive life or are of sedentary habit, anæmia is perhaps the most striking feature. In these cases, of course, hæmatinics may be indicated, but they will prove of little service if the constipation be not relieved. Under such circumstances the most satisfactory course to pursue is the administration of a saline before meals, and iron in easily assimilable form after meals. A pill containing equal parts of potassium carbonate and ferric sulphate, from one to three grains of each,

or tincture of ferric chloride in doses of from fifteen to twenty drops, may be given after meals. In some of these cases, in which the anæmia fails to yield to other remedies, I have found improvement to follow the administration of some intestinal antiseptic, and more especially of creosote, given for, if necessary, long periods of time, in doses of from five to ten or even twenty drops after meals in a glassful of milk.

I have thus far dwelt more particularly upon the medicinal treatment of the affections under consideration. This is perhaps the least important part in the care of these cases. In the majority the conditions are induced by carelessness or indiscretions in diet, either from indifference or lack of knowledge, and in many cases permanent relief, as well as future avoidance, is to be secured only by careful regulation of the mode of eating and the character of the food. In general I instruct patients of the several classes considered in these remarks to take their meals regularly at stated hours, to abstain from tea, coffee, tobacco, alcohol, pies, pastries, cakes, fresh bread, hot biscuits, sweets, and fried food, and to avoid an excess of starchy food that is capable of fermentation and the ingestion of large quantities of fluid at meals. In some instances oatmeal has a particularly bad effect, giving rise to what Sir Benjamin Ward Richardson designates "oatmeal pyrosis." I advise the taking of milk in abundance, to be slowly sipped and not gulped down; eggs, soft-boiled or poached, or if not otherwise tolerated, even boiled hard and chopped up fine and mixed with butter and salt; meat, preferably beef, roasted or broiled, rather underdone, chops well prepared; oysters, raw, broiled, or stewed; green vegetables and stewed or fresh ripe fruit. Finally, I instruct these patients to take exercise systematically, preferably out of doors, in the form of walking, riding, bicycling, or other kind of not too violent a character. A sufficiency of sleep is also to be insured: not less than eight hours and preferably nine or more hours are to be insisted upon. As a tonic, a tepid bath daily, followed by a cold sponging and brisk rubbing with a rough towel, is also advised. In a majority of instances success will follow the pursuance of the lines of treatment here laid down; in the minority the cases will resist all medicinal and dietetic treatment and resort must be had to the stomach-tube and lavage. As to this means of treatment, however, my experience has not been sufficient to justify me in speaking with any degree of positiveness; but that it is capable of much good I am very confident.

ANEURISM OF THE ASCENDING AORTA.

CLINICAL LECTURE DELIVERED AT THE POST-GRADUATE MEDICAL SCHOOL.

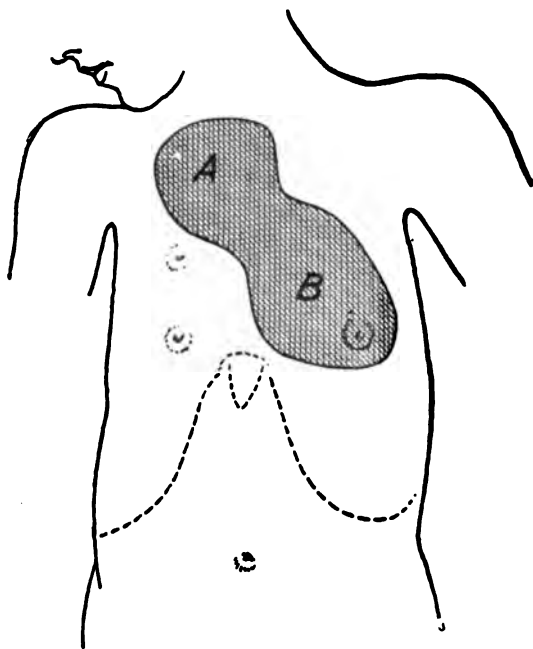
BY ROBERT H. BABCOCK, M.D.,

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Attending Physician to Cook County Hospital, Chicago, Ill.

GENTLEMEN,—This patient belongs in my ward at the Cook County Hospital, but has kindly consented to present himself this afternoon as the subject of a clinical lecture on aneurism of the aorta. He is a Norwegian, fifty-four years of age, and a sailor by occupation. His family history is unimportant, and of his personal history he states clearly that he had syphilis thirty-two years ago. His health was good with that exception until the latter part of 1893, when he began to suffer with pain in the upper portion of the right half of the thorax, and it was for this pain that he sought a medical opinion. I saw him in November of that year, and was able to make a diagnosis of aneurism of the ascending aorta, which diagnosis has since been abundantly confirmed. He has been a patient in the Cook County Hospital for twelve months past, and thanks to the administration of potassium iodide, a quiet life, and regular habits, his symptoms have not progressed,—in fact have lessened somewhat. At present he complains chiefly of pain in the right infraclavicular region, which is increased by exercise, as walking, passes through to the right interscapular region, and occasionally down the right arm. There is dyspnoea also on exertion, as in walking. He has no cough, but cannot lie long on the back because of oppression and increase of dyspnoea; his appetite and digestion are good; the bowels are regular. In fact, the symptoms complained of are exceedingly few. On inspection we observe that he is well nourished, and at once discover pulsation in the aortic area,—that is, in the first and second intercostal spaces to the right of the sternum. We observe also that the apex-beat is displaced outward, but not much, if at all, downward; that the left external jugular is dilated, the right less so, and that there is in-

creased fulness of the right infraclavicular region and the parts just above,—in other words, a “smoothing out” of the parts, or a general slight distention. Upon palpation this distended pulsating area is found to extend a distance of fully three inches to the right of the sternum, and in comparison with the apex-beat the pulsation is of equal strength. On bimanual palpation, placing one hand posteriorly and the other in front over the pulsating area, the systolic pulsation is followed by a slight diastolic thrill. The pulses show but little inequality, although to my finger the right radial seems a little

FIG. 1.



Area of dulness in a case of aortic aneurism.—A, pulsating area; B, cardiac area.

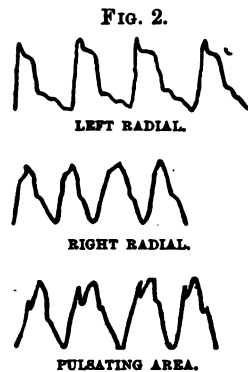
smaller than the left. It is rather a quick pulse, but not at all a collapsing one. When I have the patient rest his head against my chest, raise the chin so as to extend the trachea, and I place my index fingers below the inferior edge of the cricoid cartilage and exert slight traction from below upward, I get a distinct though not very marked tugging sensation downward, known as “tracheal tugging.” On percussion there is an area of dulness beginning at about the level of the third right costal cartilage, passing upward and outward in rather a circular direction to the clavicle. The heart is found enlarged to

the left, dulness extending nearly an inch to the left of the nipple, and the right border of cardiac dulness corresponds quite accurately with the median line of the sternum as we have outlined it upon the patient's chest. On auscultation, the first sound at the apex of the heart is nearly inaudible, being replaced by a jog imparted to the ear through the stethoscope, while accompanying the first sound is a very faint murmur. The second sound is practically inaudible, its place being taken by a diastolic bruit. A dull, booming, first sound can be heard over the base of the heart to the left of the sternum, also over the ensiform appendix. Over the pulsating area below the right clavicle there can be heard a dull, booming sound and two murmurs, a rough systolic murmur, which is transmitted distinctly into the vessels of the neck, and a diastolic murmur propagated backward onto the body of the sternum. The diastolic murmur is the louder of the two; there is a dull, booming first sound, which as well as the systolic bruit is propagated to the outer third of the clavicle, and can also be heard feebly posteriorly in the right interscapular region.

A sphygmographic tracing of the two radials shows a marked difference. The ascending line of the tracing of the right radial pulse shows an anacrotic notch near the apex, the dicrotic wave is not well marked, and there is a tendency towards obliteration of the characteristics in the line of descent. The left radial does not show the anacrotic notch, and is markedly dicrotic; the volume of the two is nearly equal. When the sphygmograph was placed over the pulsating area a tracing was obtained of the same characters as from the right radial, but very much more marked, as you see. This notch simply indicates a systolic obstruction, and it is sometimes seen very plainly in cases of aortic stenosis, an obstruction to the free passage of blood from the left ventricle. In this case the obstruction probably exists in the aneurism itself, and not at the aortic orifice.

Examination of the lungs is negative, except slightly impaired resonance of the right upper lobe anteriorly, due probably to pressure.

We have here, then, a group of symptoms which point inevitably, I think, to a diagnosis of aneurism of the aorta. We have now to determine the differential diagnosis from certain other conditions which may produce some of these symptoms, and to further determine, if



Sphygmographic tracings of the radial pulse and of the pulsating area in a case of aneurism of the ascending aorta.

possible, the location of the aneurism. Dulness over the upper portion of the chest to the right of the sternum in this area may be produced by a solid tumor within the mediastinum,—a malignant tumor, as, for instance, sarcoma, carcinoma, lympho-sarcoma,—by enlarged glands or by a mediastinal abscess. Pulsation, however, is not usually present in the case of solid tumor, unless the growth be so situated as to receive an impulse from an underlying or adjacent large vessel. When such a pulsation is communicated to the tumor it usually gives a thrusting forward impulse, not at all expansile. In this case there is no tumor to be grasped, and yet, when palpation is made with the fingers around the outskirts of this area, it can be plainly felt that the pulsation extends in all directions; it is not merely a thrusting forward, as would be the case if this were communicated through a solid body from the underlying vessel.

On auscultation, where there is a solid growth in the mediastinum, murmurs are not heard; the sounds, if heard at all, are the normal sounds transmitted by the tumor, and usually not very distinctly. Pressure signs are often exceedingly well marked in case of solid tumor. Moreover, on palpation of the apex-beat, it is not apt to be displaced as in the case of aneurism; neither is the comparative strength of the pulsation in the upper portion of the chest over the tumor and that of the apex-beat the same,—in other words, in the case of aortic aneurism, as pointed out by Balfour, the pulsation of the aneurism is as strong and well marked as the apex-beat. Balfour lays stress upon this sign: the pulsation imparted by a solid tumor from an underlying vessel is feebler than the apex-beat. In some instances these differential signs may be exceedingly well marked, and enable one to determine the condition with ease; and yet we had in Cook County Hospital last fall a colored man with a tumor presenting in the same area as in this patient, extending farther up into the neck, manifesting great pressure signs and symptoms, in which there was no pulsation, and I believe no sounds,—certainly no murmurs. Everybody who saw the case believed it to be one of solid tumor within the mediastinum. However, a few weeks before the man's death a feeble pulsation developed in the tumor, and I think the sounds became feebly audible. That changed entirely the aspect of the case, and it was subsequently found post mortem to be a large aortic aneurism lined with solid clots, which had, therefore, simulated so closely a solid tumor.

Now, let us see if we can determine the situation of this aneurism. Statistics collated by Sibson show that out of 880 cases of aneurism of the thoracic aorta, 87 involved the sinuses of Valsalva, 141 the ascend-

ing portion of the arch. Fifty-two others, which were dissecting aneurisms, also affected the ascending portion, making 193 cases. The transverse portion of the arch was involved in 120 cases, the ascending and transverse in 112, the descending portion in 72 cases, the transverse and descending together in 20 cases, and the entire arch in 28 cases. You see, therefore, a great preponderance of aneurisms in the ascending and transverse portion of the arch. An aneurism of the ascending aorta produces dulness at the right of the sternum in the first and second, and may be in the third, intercostal spaces, and pulsation, if the aneurism presents in that locality. The dulness produced by tumor of the transverse portion is found over the manubrium sterni, and the first or second intercostal spaces to the left, while pulsation is felt in the suprasternal notch. Displacement of the apex-beat to the left and downward is produced by aneurism of the ascending aorta. There may be pressure on the superior vena cava, also on the upper portion of the right lung, leading to cough and the symptoms of phthisis, and in some instances pressure upon the pulmonary artery leading to enlargement of the right ventricle. Rarely there may be pressure symptoms on the right recurrent laryngeal nerve, and even some other pressure symptoms. When situated in the transverse portion of the arch the pressure is brought to bear sometimes upon the left subclavian vein. There may be displacement and twisting of one or all of the three large branches, in which case there may be a difference in the size of the pulsation in the carotid, for instance, and in the radial of the same side of the body. Pressure on the left subclavian vein may lead to congestion and œdema of the left side of the neck. There may also be pressure upon the left main bronchus leading to symptoms of bronchial stenosis. Aneurism situated in the descending portion of the thoracic aorta is apt to present near the left scapula, and to manifest a series of signs and symptoms very different from those in this case, so that we shall not consider aneurisms in this location to-day.

We have here dulness and pulsation to the right of the sternum ; we have displacement of the apex-beat downward and to the left, with equal strength in the impulse both of the tumor and the apex-beat ; slightly less volume and different characters presented by the right radial as compared with the left. We have slight symptoms of pressure on the superior vena cava, the left external jugular being more dilated than the right. There are no pressure symptoms referable to the left recurrent laryngeal, and no evidence of pressure upon the sympathetic in such a way as to involve and cause inequality of the pupils. All these signs and symptoms lead inevitably to the diagnosis of aneurism of the

ascending portion of the aorta, involving also the anterior portion of the transverse arch.

The "tracheal tugging" enables us, I believe, to determine, as do other pressure signs, more precisely the situation of this sac,—that is, which portion of the vessel is involved. Tracheal tugging was first described by a surgeon in the British army by the name of Oliver, subsequently studied by McDonald, of Montreal, and has been still further studied by two London physicians, Drs. Grimsdale and Ewart. It is by no means pathognomonic of aneurism; it can hardly be considered a positive sign. These latter physicians, out of one hundred and eighteen cases examined promiscuously, found this sign present in sixteen per cent. It was found in anæmia and chlorosis, hypertrophy of the heart, and in a case of mitral disease, as well as in insufficiency of the aortic valves. It was observed in one case of typhoid fever, and also in some individuals who appeared in perfect health. When in conjunction with other signs of aneurism, it becomes an exceedingly strong confirmatory sign. It must be produced by pressure of the vessel during expansion upon the left main bronchus or the lower portion of the trachea just before the bronchus is given off. The arch crosses over the left bronchus in such a way that an aneurism situated on the postero-inferior aspect of the anterior portion of the transverse arch would press upon the left bronchus. There must be sufficient amplitude of excursion on the part of the aneurismal sac to cause this tugging downward of the trachea, and it can be intensified by deep inspiration. In this particular case I believe the aneurism presses somewhat upon the superior vena cava, the lower portion of the trachea and left bronchus,—in fact, I am sure I discovered some time ago a very slight tendency on the part of the trachea to deviate a little to the right, or rather I was able to sink my left forefinger between the trachea and left sternocleido-mastoid more deeply than on the right side. Either the trachea was pushed a little to the right, or there was slight pressure upon its left side so as to indent it, so to speak, and thus simulate deviation to the right. I regret to say, laryngoscopic examination, to determine this point, has not yet been made.

Moreover, there are two facts in the history of this man's case which go to corroborate the diagnosis of aneurism, one of which is syphilis. Syphilis is undoubtedly the greatest predisposing factor in the development of this vascular disease. The man's occupation was that of a sailor, and as such the arduous duties of his calling would expose the aorta to unusual strain. If the syphilis had led to sclerosis of the aorta, as we know it often does, then under the effect of unusual

strain the vessel might easily yield at the point where the degenerative process had weakened its wall, and an aneurismal sac be subsequently developed. The case is interesting, furthermore, with reference to the symptomatology,—interesting negatively, so to speak, since the man complains of but very few symptoms. The pain of which he complains is by far the most frequent of all symptoms. It is usually due to pressure upon the intercostal nerves, and, like other pressure symptoms, depends upon the direction in which the tumor develops. The tumor may develop towards the external parts, and pressing on the chest wall will often cause erosion of it. We know that sometimes aneurismal tumors of immense size have been carried for years. One instance is narrated of an Irishman in Dublin, I think, who followed the calling of a prize-fighter. This man had an aneurism of the ascending aorta which had entirely eroded the chest wall and presented a tumor the size of a cocoanut. Whenever the man went into a fight he always protected his tumor by an iron cage. When the aneurism develops centripetally the pressure signs and symptoms become very marked. It is then we have the symptoms due to pressure upon adjacent blood-vessels and upon the lung, leading to symptoms of phthisis.

The life-history of these tumors is variable. Patients may live for years in comparative comfort. In other instances we know the progress of the aneurism is rapid and causes great distress. Death may take place gradually from asthenia, from pressure upon and destruction of the lung, or through rupture of the sac, the blood in such a case being poured into the adjacent parts, into the bronchus, the trachea, pleura, or pericardium in those instances in which the growth has developed at the base of the ascending portion of the aorta.

The treatment of these cases is, of course, chiefly medical, and more hope of arresting the disease is afforded by the administration of iodide of potash than by any other known medicament. It is important also that arterial tension be lessened; therefore constipation should be carefully corrected if it exists. The patient must be warned against unusual exertion, particularly in cold weather; warned against any condition which, like a cold wind, produces constant chilling of the surface and contraction of the peripheral arterioles, in this way throwing blood into the interior. Pressure within the aneurism is thereby greatly and suddenly increased, and may in some instances be sufficient to cause rupture. The great aim of treatment is, in addition to lessening internal pressure, to facilitate the formation of coagula, or strata of coagula, which may line the sac, and thereby reinforce the weakened walls. Iodide of potash seems in some rather inexplicable manner to afford

the best chances of either arresting the progress of the disease or favoring its cure, by allowing a coagulation of the blood to take place. Surgical interference is occasionally resorted to, but I believe hitherto without any very great success. Many surgeons think the results are sufficient to warrant surgical interference by the use of electrolysis or the introduction of foreign bodies when the sac of the aneurism is so situated as to allow the surgeon to enter it with facility, and to favor the formation of clots within the sac, and allow the channel to remain at a distance from the side on which the sac develops.

The production of murmurs, as well as thrill and various other signs, depend upon the character of the aneurism. If it be filled with clots, allowing thereby only a comparatively small channel through it, there may be no murmurs, no thrill produced. If, however, the blood should eddy into the sac in such a way as to be thrown into audible vibrations, we may have not only murmurs, but a palpable thrill. The murmurs and sounds most usually heard over an aortic aneurism are probably a systolic murmur, with a markedly accentuated second sound. A diastolic murmur is rare. Sansom says that it was found in six out of one hundred and thirty-two cases investigated by him. Sometimes we have a double murmur,—a systolic and a diastolic. A systolic murmur is not by any means sufficient for the diagnosis of aneurism, since it may be produced by stenosis of the aortic orifice. If, however, it be followed by a greatly accentuated second sound it becomes very suspicious of dilatation of the aorta, for when stenosis of the aortic orifice exists, the second sound produced by the tension and closure of the valves is apt to be deficient in strength, owing to the lessened volume of blood thrown into the vessel through the narrow orifice.

ANEURISM OF THE AORTA; THORACIC ANEURISM; ABDOMINAL ANEURISM.

CLINICAL LECTURE DELIVERED AT THE COOK COUNTY HOSPITAL.

BY JAMES B. HERRICK, M.D.,

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GENTLEMEN,—I showed you, several weeks ago, five cases of aneurism, and had the opportunity, later, of exhibiting to you the post-mortem specimens from three of these cases. I also showed you, the week before, a number of cases illustrating arterio-sclerosis. We have, therefore, taken up for thorough discussion the topics of arterio-sclerosis and of aneurism, two subjects that are very closely related.

In exhibiting to you to-day a few other cases of aneurism, I shall, consequently, take it for granted that you understand the etiological factors of this affection, its pathology and morbid anatomy. I wish to emphasize by these cases, thus grouped together, some of the more important clinical features of this condition.

I will merely call your attention to the fact that arterio-sclerosis (*endarteritis chronica deformans*) is the commonest cause of aneurism, and that among the commonest causes of arterio-sclerosis are old age, syphilis, and chronic alcoholic intoxication. We know that the arteries oftenest affected are the popliteal artery, the small arteries of the brain, and the aorta, particularly the thoracic portion. Let me recall very briefly the cases that I showed you a few weeks ago.

CASE I.—You remember the colored man, of middle age, with a history of syphilis, in whom a ready diagnosis of aneurism of the ascending aorta was made. The picture and the history were both classical. Subjectively there were pain in the chest, radiating down the right arm and up the right side of the neck, dyspnoea amounting at times to orthopnoea, hoarseness. Objectively we noticed the turgid

veins of the neck and face, the suppressed right radial pulse, the paralyzed vocal cord; and below the right clavicle was the swelling, pulsatile, and accompanied with a bruit. Pulsation had, as you remember, been somewhat variable in this case as in one of the others, and the same had been true of the bruit. This we accounted for by variations in the force and rapidity of the heart's action, and by alterations caused in the blood-currents by changed conditions in the thrombotic masses lining the aneurismal sac. Death was sudden a few weeks later. The autopsy showed an aneurism of the ascending aorta with rupture into the pleural sac.

CASE II. was one of abdominal aneurism in a man past middle life, with a history of syphilis. He entered the hospital complaining of severe pain in the back that had persisted in spite of months of treatment. No tubercular or malignant disease of the vertebræ could be discovered, and only the most careful palpation in the epigastrium revealed a pulsating mass, wider than the aorta, and over which a distinct bruit could be heard. You remember I spoke, at that time, of the difficulty and uncertainty in diagnosing an abdominal aneurism by means of epigastric pulsation or bruit; for in many people, particularly those with thin abdominal walls, the pulsation of the abdominal aorta can be clearly made out and a bruit can be heard. But in this case, the pulsating mass was plainly wider than the aorta should be; it was tender upon pressure, and a bruit could be heard. These characteristics—that is, pulsation, bruit, tenderness—could only be made out in this distinctly localized area, so that the diagnosis of abdominal aneurism was made with positiveness.

A few weeks after the patient was exhibited to you he suddenly died. The autopsy revealed an aneurism of the abdominal aorta just below the diaphragm. The sac had become adherent to the diaphragm, through which it had perforated into the left pleural cavity. This was the immediate cause of death. This specimen I again exhibit to you, and with it the adjacent vertebræ. You see here a beautiful example of the effects produced by the pressure of the aneurism. Notice particularly how the bony substance of the vertebræ has been eroded, so that not more than two-thirds of the osseous structure of these two vertebræ still remain. The more yielding, softer intervertebral disks are still comparatively intact. I wish that you would remember this specimen, because I shall soon exhibit to you a patient, also with abdominal aneurism, in whom, if you keep clearly in mind the picture of these vertebræ, you will more readily understand some of the symptoms noticed in the patient.

CASE III. was a man, fifty years of age, who admits having had syphilis, combined with a history leading to the suspicion of pleurisy three or four years back, in whom I made a diagnosis of endarteritis chronica, double aortic disease, a thickened pleura, and fluid in the left chest. No positive diagnosis of aneurism was ventured. The covering of the lung was thought to be immensely thickened, because both the house physician and I failed with an ordinary exploring needle to perforate some thick resisting substance of about the consistency of cartilage, which seemed to be the thickened pleura. While, therefore, all the physical signs of hydrothorax were present, we were never during life able to draw off any fluid, although ten different exploratory punctures were made. Other efforts were discontinued because of the pain, which made the patient refuse permission to proceed further. The dulness and the murmur to the right of the sternum and near the base of the heart were believed to be due to double aortic disease in a heart dislocated to the right by a large amount of fluid in the left chest.

The patient's dyspnoea became worse and worse; he gradually failed in strength, and died of asthenia. The autopsy revealed a double aortic lesion, a pleura half an inch in thickness, tough and fibrous, and a large amount of clear serous fluid in the left chest, but also revealed (and you remember having seen these specimens) an aneurism with a sac about the size of an orange, firmly united to the pericardium and springing from the first portion of the aorta. This was a most instructive case to you as to me, and shows the great difficulties in the diagnosis of thoracic aneurism where there is a complicating valvular disease, hypertrophy of the heart, and a large amount of fluid in the chest cavity, causing dislocation of the heart.

CASE IV.—This was a case of traumatic aneurism of the femoral artery due to a bullet-wound. For years the patient had carried a small aneurismal dilatation with very little discomfort. A few days before his entrance to the hospital he had suffered quite a sharp pain over this trifling swelling. The mass had increased rapidly in size, and when he entered my ward, over the inner aspect of the right thigh was a large mass the size of a foetal head, over which the skin was tightly drawn, and over one point of which there was distinct fluctuation, pulsation, and bruit. I regarded the case as in such imminent danger that I had him transferred to the surgical side, and some of you, I trust, saw the operation that was done in the surgical clinic by Dr. J. B. Murphy. The patient, following the ligation of the femoral artery and the turning out of an immense blood clot that was found, has made a good recovery.

CASE V.—One of the patients who was before you on a previous occasion has kindly consented to come before the class again. He is fifty-two years of age. Two years ago he began to complain of pain and a sense of oppression in the chest, with difficulty in breathing. After remaining in a hospital for three weeks he was somewhat improved, but a few months later he noticed a distinct pulsation in the right side of his chest external to the base of the sternum. Over this area of pulsation there was great tenderness, as there is now. Even a slight pressure is painful. He suffers from pain in the right side of the chest, which shoots up the side of the neck and down the arm. Over this area of pulsation we can by percussion get dulness, which reaches from the clavicle to the second rib. I cannot make percussion in this case sufficiently forcible for you to hear, for the reason that deep percussion causes severe pain to the patient, and you know that anything like rough manipulation in cases where the aneurism is merely protected by overlying skin is positively dangerous, for fear of rupture. There is enough pulsation visible in this case, so that some of you (who are sitting where the light is right) can see it, even from the amphitheatre seats. At a point about three inches to the right of the sternum, in the second interspace, my finger is lifted synchronously with the apex-beat, which you can see lower down. It is always a suspicious circumstance when you see on the chest of a patient apparently two apex-beats, one in the normal position, or perhaps displaced a little to the left, and the other where you see it in this case, near the base of the heart, and particularly to the right of the sternum. You can in some of these cases almost venture a diagnosis at first sight, upon the existence of two apex-beats in the chest. Over the dull area there is a very distinct systolic bruit. No bruit ought ordinarily to be heard here.

We have, therefore, all the physical signs of aneurism,—enlargement, tenderness upon pressure, pulsation that is distinctly felt—and usually that pulsation, as you doubtless know, is expansile—upon percussion, dulness, and upon auscultation, a bruit. The pressure symptoms in this case are chiefly confined to pain in the right chest and to hoarseness. Hoarseness is not now present, but the patient tells us that he has in the past been hoarse for weeks at a time. There is a distinct bulging of the anterior wall of the trachea, just above the bifurcation, that is seen with the laryngoscope.

This is an aneurism of the ascending portion of the aorta, the commonest seat of an aneurism. Next in frequency the transverse portion of the arch, and then the descending portion, are affected.

CASE VI.—The next patient I show you is forty-seven years of age, colored, and a laborer by occupation. He says he has been sick for about one year. He thought he contracted a severe cold, and has had trouble with his voice ever since. He is now, as you notice, very hoarse. He has also suffered from cough without any expectoration. The pain from which he suffers is confined almost entirely to his chest, and is much worse when he coughs. He has occasionally coughed up a little blood. The worst complaint he makes is with regard to breathing. He is obliged to sit up at night, being unable to lie down. There is a history in this patient of specific infection some years ago.

We find on inspection of the patient's chest very little that attracts our attention, though, when I have him lie down, you see that the vessels of the face become markedly congested, the breathing becomes very difficult, and he is soon obliged to sit up again. He suffers less from orthopnoea than when he entered the hospital. The apex-beat of the heart cannot be seen, but the first sound is best heard beneath the sixth rib. I can see no abnormal pulsation, nor can I find any bruit within the chest. On feeling the pulse I find it is beating with regularity about one hundred times to the minute; but I find, also, something that is very striking,—namely, the left pulse can scarcely be felt, while the right is a strong one,—in other words, there is a marked inequality of the pulses, with the advantage in favor of the right. There is some epigastric pulsation.

The percussion dulness is shown by the marks outlined upon the chest. There is, you notice, an increased area of cardiac dulness. There are two sets of marks here: one shows dulness in the erect posture, as he is now; the other, less extensive in area, the dulness in the recumbent position. There has been a little difference of opinion among the physicians who have examined this patient as to the extent of the dulness. That comes, I think, from the fact that the aneurism from which this patient suffers is not one in close proximity to, or contact with, the chest wall; but when the patient is recumbent the mass is covered with more or less lung tissue. While we get an increased area of dulness to the left of the sternum and towards the base of the heart, of greater importance is the fact that on auscultation there is heard a bruit over the entire left chest, with greatest intensity to the left of the heart and away from the site of the valvular sounds. Moreover, it is heard posteriorly and to the left of the spinal column.

Careful examination with the laryngoscope shows that there is paralysis of the left vocal cord. This is accounted for by the pressure upon the recurrent nerve. There is no evidence of fluid in the chest

of this patient, though with aneurisms we frequently meet with fluid in the chest, a fact that often obscures the diagnosis.

We have here an aneurism within the thorax, that produces pain mostly upon the left side, that causes almost a suppression of the left radial pulse, with paralysis of the left vocal cord. The signs of bruit and dulness are also in the left chest. This must be, I think, an aneurism of the aorta, not of the ascending portion, but, what is more likely, of the descending part of it. Occasionally, in an aneurism of the ascending portion of the aorta, the sac may be forced to the left, so that we may have dulness and a bruit to the left of the sternum, with pressure symptoms also referred to the left chest, all of which may simulate aneurism of the transverse or descending portion of the aorta.

CASE VII.—I showed you, a few weeks ago, one of the most instructive cases that I have ever exhibited in this clinic, a case of abdominal aneurism in which the sole complaint of the patient was of pain in the back. I am able to exhibit to you to-day a case quite similar to that one. We seem, in fact, to be having what might be termed an epidemic of aneurisms. It is unusual, even among our large number and great assortment of cases, to have so many cases of aneurism in the course of a few months. In the case that was exhibited a few weeks ago, you remember, there was detected upon careful palpation in the epigastric region a pulsating mass, somewhat tender upon pressure, over which a faint bruit could be heard. A diagnosis of aneurism was made, and was confirmed by the specimen that was subsequently shown to you.

This man is fifty years of age, bricklayer by occupation; denies rheumatism, syphilis, but admits having been a hard drinker. The family history gives us no aid as to the diagnosis or etiology of the present illness. One year ago he began to complain of pain in the back. For eight months he has been unable to work, and has been confined to bed for four months. The pain of which he complains is located in the lumbar region, radiates into the left hip, and up into the left thorax. The pain he describes as sharp and lancinating in character. He has at times a little trouble in moving the leg and feels as if insects were crawling up the legs. He has had sensations of tingling, of pins and needles, formication, numbness.

Examination shows that he is slightly pale. The eyes, ears, nose, tongue, and head are absolutely negative, as are also the heart, lungs, and urine. On examining the abdomen there is absolutely nothing to be seen upon inspection. Upon palpation there can be made out no enlargement of any organ, and only by deep pressure in the epigastric

or umbilical regions am I able to make out anything like a pulsation. I should certainly not be able from the examination I make of the abdomen to call this a case of aneurism.

There are many cases where there is no aneurism, in which we get much more pronounced pulsation of the abdominal aorta than we have here. The thin wall of the abdomen permits you often to grasp the aorta between the two fingers, so that you get a pseudo-expansile pulsation; but you cannot make a diagnosis of aneurism in these cases unless you can feel distinctly a rounded mass or grasp it; unless you can prove the aorta enlarged; unless you have pulsation laterally, backward and forward,—in other words, a true expansile pulsation. A faint bruit is heard. But even with this one must guard against a diagnosis of abdominal aneurism, as this is not infrequently heard in the normal aorta. That cannot be made out in this case. There is no inequality in the femoral arteries that can be detected.

I now turn the patient over and expose the back. By watching closely at this point, just below the last rib on the left side, a little to the left of the spinal column, you see a slight bulging there, of rounded outline and with a heaving impulse. If I make firm pressure you can all see this impulse, which lifts my finger, or the pencil, or the glass of water I place over it. There is, too, if you notice carefully as I put my two fingers over the mass, not merely an up-and-down pulsation, but a pulsation laterally as well,—that is, an expansile pulsation. On the right side there is absolutely nothing that corresponds to this mass. Then we find over this mass tenderness and dulness. The patient holds the muscles of the left side of the back stiffly, rigidly. It is very apparent as he sits up that he keeps these muscles as quiet as possible, in order to avoid the pain caused by their movement. Over this area there is not heard now anything like a bruit. At one time there was a slight bruit. I have already referred to the fact that in aneurisms the bruit will appear and disappear, depending upon the degree to which thrombus formation has occurred. At one time the thrombus may be situated in such a position, and may be of such thickness, that the movements of the blood are not sufficient to produce the sound we call a bruit. At another time the thrombus may be changed in thickness and shape, the sac is dilated a trifle, and the blood-current of such a character as to produce these sounds.

These aneurisms, as in the case of the specimen which is being passed around, will press upon the neighboring organs and tissues, and cause pressure atrophy of these organs, unless they can keep out of the way. Movable organs are dislocated; unyielding organs or tissues, as

the bone, undergo pressure atrophy. Pressure upon the bones of the spinal column will cause them to give way, and there is necrosis. So we often find the bones of the spinal column yielding, and the cord finally pressed upon. This patient has some evidences of beginning pressure paralysis of the spinal cord. There is certainly pressure upon the nerve-roots. He has had lancinating pains running down the left extremity. He has paræsthetic sensations, formication, tingling, and at times, so he says, a weakness of the left leg. We ought to test the reflexes, to see if there is any difference between them on the two sides. Inasmuch as the lesion is situated not far from the lower dorsal or upper lumbar region of the cord, if pressure is sufficient to destroy entirely the function of the lumbar cord, we should expect the patellar reflex to be diminished; while, on the contrary, if pressure is high enough, so that the lumbar segment which has to deal with the reflex arc is spared, we may have the reflex exaggerated. I cannot find any difference in the reflexes. There is a suspicion of ankle-clonus on the left side, and both reflexes, if anything, are slightly exaggerated. There are no rectal or vesical symptoms.

This case is very similar to the one you saw a few weeks ago, and we can make here with absolute certainty, I think, a diagnosis of abdominal aneurism. Whether it is the aorta or some one of its branches that is affected, it is difficult to say. All of the abdominal organs seem to perform their functions normally. In some cases of abdominal aneurism there may be pressure that interferes with the function of some abdominal organ. The stomach will become disturbed; there will be gastralgic attacks, vomiting; the ureter can be pressed upon, and we may have hydronephrosis; the intestine may be pressed upon, and we may have obstruction of the gut; there may be obstructive jaundice, ascites from obstruction of the portal vein. But there is nothing of the kind here.

The two cases you have seen are very instructive, and the lesson they teach is this: that where you have a case with nothing but pain in the back complained of, and can find nothing else to account for it, you must look out for abdominal aneurism. Remember that the two cases are different in this respect. In the first case we could find nothing by examination posteriorly, but could find anteriorly a pulsating mass, over which there was a bruit. In this case we found nothing in our examination anteriorly, but posteriorly we found a pulsating mass without any bruit. I remember two years ago showing the class an abdominal aneurism which resembled this case very closely, pain in the back being the sole complaint; and I also well remember

my surprise when, one day in the examining-room of the County Hospital, I gazed on a large pulsating mass the size of a foetal head in the abdomen of a man whom I had stripped in the routine manner. I had already made up my mind, from his history of pain in the stomach, vomiting, belching of wind, etc., that I had but a case of chronic gastritis, when in reality it was a case of abdominal aneurism. Remember, therefore, as one of the lessons of this clinic, that pain in the abdomen, in the back, or in the chest should always lead us to think of the possibility of aneurism, particularly where the patient is an adult male, a syphilitic, and an alcoholic.

PLEURISY WITH EFFUSION; PHTHISIS COMPLICATED BY PLEURISY WITH EFFUSION; PURULENT PLEURISY SECONDARY TO PNEUMONIA.

CLINICAL LECTURE DELIVERED AT THE CHICAGO POLYCLINIC.

BY JOSEPH M. PATTON, M.D.,

Professor of Internal Medicine in the Chicago Polyclinic.

GENTLEMEN,—We have here to-day three cases which illustrate phases of pleuritic exudation which are constantly met with by the general practitioner and with which he has frequently to deal. They are of special interest to us because they come—at least in the early stages—under the care of the general practitioner.

This man is twenty-five years of age, a plumber by occupation, and has been sick several weeks. He does not know just how or when his illness commenced, but noticed that he was losing strength; that he was a little short of breath, and that he had a slight cough. The loss of strength and the shortness of breath increased, so that he was compelled to quit work, and he came here to-day for advice.

On inspection of the chest we find that the left side is fuller than the right; that there is loss of motion on the left side. The right side expands more than usual. The apex-beat is not to be found in the usual situation, and on close inspection we find it to the right of the sternum, between the right edge of the sternum and the right parasternal line. On palpation we find vocal fremitus absent below the level of the third rib on the left side both anteriorly and posteriorly. The intercostal spaces are not so plainly felt as on the right side. On percussion we find dulness over the area of lost fremitus, and above the level of the third rib there is an exaggerated pulmonary resonance. On auscultation there is partial absence of all vocal and respiratory sounds below the level of the third rib. Anteriorly the vocal or respiratory sounds can scarcely be heard; posteriorly, at the angle of the scapula, there is breathing of a bronchial character. I call your attention to this particularly, because the rule laid down in your

text-books, that there is complete absence of all vocal and respiratory sounds in this class of cases, is not to be accepted as absolutely true. Usually in the majority of cases you will find very dim respiratory sounds over the entire chest wall, and in practically all cases you will find breathing of a bronchial character at the angle of the scapula. The man's temperature is 101° F., the pulse is rapid and small. These signs show us that there is a collection of fluid in the left pleural cavity of considerable extent. In these cases of subacute pleurisy there is little danger of confounding them with other conditions, though they may be confounded with pneumonia, cancer of the lung or pleura, enlargement of the spleen, and when occurring on the right side with enlargement of the liver. From pneumonia they are distinguished by the more acute onset of the disease, by the character of the respiration, by the rusty sputa, and by the slower pulse. From cancer of the lung or pleura it is often difficult, and may be impossible, to distinguish this condition except by the use of an exploring needle. From enlargement of the spleen it is readily distinguished by the extension of the splenic dulness downward as well as upward. From enlargement of the liver, when occurring on the right side, it is distinguished by the lower line of dulness and by the upper line of dulness, in enlargement of the liver the former being lower behind than in front. The course of this kind of effusion in the pleural cavity is slow and without any tendency to recover of itself unless the quantity of the effusion is small.

The question of treatment depends largely on the character of the case and the amount of the effusion. There is considerable difference of opinion among various authorities as to our ability to dissipate these effusions without operative interference; also as to the time for operation and the amount of fluid demanding interference. It has been claimed by many German writers that effusions into the pleural cavity can be prevented, or, when present, absorption can be caused by the use of the salicylates. Köster is one of the chief advocates of this treatment. He advises salicylic acid in fifteen-grain doses, or salicylate of soda in twenty-grain doses, three or four times a day. Dock, in summarizing the views of a number of writers on this treatment, concludes that salicylic acid, salicylate of soda, and salol are efficient remedies for influencing the absorption of pleural effusions; that they are harmless and occasion no trouble to the patient; that they are best adapted to pleurisies of recent origin and have little effect in suppurative pleurisy; that the effect of the treatment is probably chiefly through its action on the kidneys, and that its effect is to be judged by

the amount of urine passed. Personally our experience in this clinic is against trusting to the use of such remedies for the absorption of the pleuritic effusion. If the effusion is small and occasions the patient little difficulty in breathing or causes little interference with the action of the heart, there is no objection in trying to get rid of the effusion by the use of such remedies or by the use of diuretics, cathartics, or diaphoretics, but, as a rule, we will find that the results of these medicines are unsatisfactory. This is always the case when the effusion is large. The pressure, in the latter case occasioned by fluid on the vessels of the pleura, prevents absorption through the blood-vessels and the lymphatics of the effused material, and until this pressure is lessened by reduction of the amount of fluid there is little chance of causing absorption. In children where there are small serous effusions local applications have been recommended for the production of absorption. Recently phenic acid has been used for this purpose and is advised by Oliver. The acid is dissolved in alcohol and applied with a cotton swab to a localized surface of the chest wall, which is marked off with vaseline and the skin previously cleaned with ether. This may be of service in small effusions, but, as before said, such treatment is of doubtful efficacy.

As to the question when to operate in these cases, there is some difference of opinion. Beaumetz and Dieulafoy advocate early interference, at least when there are three pints of fluid present. Rickerds objects to aspiration during the height of the fever and waits until the temperature falls. Others operate whenever there is sufficient interference with the respiration or action of the heart to cause the patient annoyance, and this should be our chief indication. When the lung is so compressed as to cause the patient to suffer from loss of breath, when the heart is pushed over to the right of the sternum, we are not justified in wasting time on medicinal measures, but should proceed at once to aspiration. In all effusions, whether large or small, if there is any interference with the action of the lung or of the heart, they should be aspirated, no matter what the quantity of fluid. The temperature in these cases of subacute pleurisy does not contra-indicate operation. As to the amount of fluid to be removed, it is our practice to remove as much as possible at each aspiration, gauging the amount by the sensations of the patient. We will place this patient in a sitting position with the arm thrown across the chest so as fully to expose the intercostal spaces of the left side, and will introduce the needle in the seventh intercostal space in the anterior axillary line, and you see the fluid flows freely. We will remove as much fluid as we can, and when

the patient complains of constriction of the chest with a tendency to cough, which he cannot repress, or complains of pain in the chest, then we will stop. The fluid in this case, you see, is quite light colored, contains very little lymph, and evidently the lung will expand freely upon the removal of the fluid. As the case has not been of very long standing, we will probably be able to remove at least two-thirds of the fluid in the pleural cavity before causing the patient any special discomfort. It is always well, if you have a nervous patient, before beginning this operation, to give him a hypodermic injection of from one-eighth to one-sixth of a grain of morphine as a cardiac stimulant. It is believed that the special dangers of aspiration are from cardiac failure, syncope, and embolism. Carefully performed, there will seldom be any special risk of any of these accidents occurring.

As to the after-treatment, we will give the man a mixture containing one-eighth of a grain of sulphate of morphine, ten drops of dilute hydrobromic acid, in syrup of tolu, every two to four hours, to quiet his cough, and place him upon some syrup of the iodide of iron, three times a day, which is the best remedy for these cases.

PHTHISIS COMPLICATED BY PLEURISY WITH EFFUSION.

The next case is a young man, nineteen years of age. He appeared in the clinic two weeks ago presenting all the signs of advanced phthisis. He gave a family history of phthisis, and had been under treatment for a number of months. He had rapidly lost flesh and strength, and presented the physical signs of advanced phthisis of the upper and middle lobes of the left lung, also of the apex of the right lung. His temperature was 102° F.; pulse was rapid and weak. He was barely able to walk, and had regular and severe night-sweats. He stated that this weak condition seemed to date back about three weeks before coming here, previous to which time he was able to get around with comparative comfort. His physicians said that nothing more could be done for him. On examination of the chest, besides the usual signs of advanced phthisis, we noticed that the apex of the heart was displaced towards the right a distance of two inches. Examination of the heart itself showed it not to be enlarged. There was no condition on the right side of the chest or in the mediastinum apparent which should cause the displacement of the heart. In searching for the cause of this displacement, we found a localized area on the left side extending from the fourth rib to the seventh, just posterior to the nipple line, in which the physical signs of a diseased lung were unusually obscure. Although the râles in the lung could be distinctly

heard through this area, they were not nearly so plain as they were outside of it. A hypodermic needle introduced in this area showed the presence of a serous effusion in the pleura. Evidently the displacement of the heart was caused by an encapsulated serous effusion in the left pleura, which exerted pressure on the heart, displacing it towards the right.

This is an interesting condition, because it illustrates to us one of the associated conditions of phthisis which we are apt to encounter and which is frequently overlooked. It is claimed by many that all cases of subacute inflammation in the pleural cavity are of tuberculous origin, or at least that all persons who develop such effusions may be considered as eligible candidates for tuberculosis. However this may be, many cases like the first one shown to-day completely recover from the effusion, and for many years and often during life never show any evidences of tuberculosis. On the other hand, patients suffering from encapsulated effusions should be carefully watched for the presence or development of localized tuberculosis in the corresponding lung. This young man was aspirated at the time the collection of fluid was found, and we withdrew eight ounces of serum. The heart moved over to the left an inch and a half, and remains still one-half inch to the right. After the operation his fever came down, his pulse became less, and he felt in every way much better. His night-sweats are not nearly so severe, his appetite is good, and he is able to walk quite a distance without difficulty. Evidently, then, the encapsulated effusion, probably by the pressure it exerted on the heart and on the already retracted lung, caused so much disturbance as to aggravate his symptoms to the extent shown upon his entering the clinic. The catarrhal condition of the middle lobe of the left lung underneath the area formerly occupied by the effusion is not nearly so great as it was at the time of the operation, and although the lung is much indurated and there are numerous adhesions of the pleural surfaces, there is every probability of his regaining his strength so as to be in a comfortable condition for an indefinite period.

He will now be placed on guaiacol internally, and we shall watch his further progress.

PURULENT PLEURISY SECONDARY TO PNEUMONIA.

A third case is this little girl, six years old. Five weeks ago she was taken suddenly ill with an acute pleuropneumonia of the upper lobe of the left lung. Pneumonia of the upper lobes you know is especially frequent in children. The associated pleurisy was on the

posterior portion of the lung underneath the scapula. There was a good deal of pain, with a temperature of 104° F., a pulse of 150, and respiration of 45. She was an exceedingly nervous child, and, on account of her nervousness as well as of her age, cold was contra-indicated in the treatment of the case. We therefore applied hot poultices to the chest, changing them every three hours, and gave her internally two and a half grains of muriate of ammonia with three drops of tincture of nux vomica every two hours. Under this treatment the disease ran its usual course, with a temperature varying from 102.5° to 104° F. On the seventh day the temperature fell to 101° F. On the evening of the eighth day it was down to normal. At this time it was noticed there was not a corresponding reduction in the pulse and respiration, the former remaining at 120 and the latter at 35. This was regarded with suspicion, and frequent examinations of the pleura were made. On the following evening the temperature was up to 101° F., and on the subsequent evening, two days after the reduction of the temperature, it had again reached 102° F., being 99.5° in the morning and 102° in the evening. Examination of the pleura at this time showed signs of accumulation of fluid, and at the end of five days the physical signs showed that the left pleural cavity was full to the level of the third rib.

Here, then, we had a purulent pleurisy, secondary to the primary pneumonia, a metapneumonic empyema. Empyema is always secondary in its occurrence, and those cases which are secondary to the infectious diseases are usually of rapid occurrence with a corresponding prostration of the patient. On the fifth day after the beginning of the effusion in the pleura we aspirated, removing about thirty ounces of pus. Following this there was some relief to the respiration with a reduction of fever. At the end of a week the fever had returned to its former height, with the same fluctuation, the same interference with the respiration, and the same rapid pulse. Then came the question as to what was best to do, whether we had better keep on aspirating, or whether we had better institute some other form of drainage. Undoubtedly some cases of empyema occurring secondary to infectious diseases will get well by repeated aspirations, and some writers recommend, in young children especially, to aspirate as often as the cavity refills, holding that it is not necessary to institute free drainage. While this may be true, it is doubtful if we are warranted in assuming the risk of subsequent contraction of the lung incident to the repeated accumulations of fluid which will always be present when such a course is adopted. In this case the accumulation of the fluid was quite rapid.

In three days there was enough fluid to cause interference with the respiration and the circulation, and when the accumulation is as rapid as that, I do not think it is good practice to rely on aspiration. In this case we decided then to resort to drainage, and the question arose as to what form of drainage would be best adapted to a case of this kind. The general tendency at present is to make pretty free drainage, some advocating a double drainage-tube, some a double opening, some resection of one, two, or three ribs. While resection of the ribs may be necessary in a great many cases of a chronic nature—cases of long standing, where the contents of the pleura are thick or consist of flakes of lymph, or where there has been some calcareous deposit—and is undoubtedly frequently necessary in tubercular empyema, I do not think that it is necessary in this class of cases, which come on rapidly, as secondary features to infectious diseases. I believe with Herz that rib-resection is unnecessary in order to establish pleural drainage in a great many instances. The method that you will employ must be adapted to the individual case. Our practice has been to drain these cases of empyema where the fluid accumulates rapidly, especially these cases of metapneumonic empyema, by simple siphonage. This is a method recommended by a number of German physicians as giving good results, and in our experience has certainly been very satisfactory. In this case we instituted drainage in this way: A trocar was passed into the seventh intercostal space in the anterior axillary line, and on account of the narrowness of the intercostal space a smaller trocar than we usually use had to be employed, one which would just admit two-sixteenths of an inch tubing. Through this was passed a flexible No. 8 catheter. The catheter was employed because a soft rubber tube would be apt to flex upon itself and so block the drainage, this being the chief objection urged by Schede against this method. If you could depend upon your patient lying perfectly quiet and obedient to all instructions, a soft rubber tube would probably be satisfactory, but in a nervous, irritable child, constantly shifting her position, it would hardly be safe to trust to a soft tube. Ordinary syringe tubing which is somewhat stiffer, and which we have employed with success in older patients, should not be employed in these cases, because a one-eighth-inch tube gives a very small lumen, and drainage would probably not be satisfactory; therefore the flexible catheter was used. This was left projecting from the chest wall four inches, and connected with a rubber tube by glass coupling, which tube passed into a jar of fluid at the bedside. This connecting tube was long enough to allow the child to change position, to sit up in bed, to move from one portion

of the bed to another, and also to be taken out of bed and placed in a chair. A stopper was placed on the tube three feet from the chest wall, and a nurse instructed to empty the tube by stripping it between her fingers as often as it filled up, as shown in the glass coupling. As soon as this drainage was instituted the temperature went down and fluctuated between 99.5° and 100.5° F. The respiration became much easier, the child's appetite improved, she slept well, and was much more comfortable. At the end of two weeks the amount of the discharge was very much less. The catheter was then withdrawn three inches, leaving about an inch and a half still inside the pleural cavity. This was allowed to remain for another week, and as the discharge had greatly diminished, consisting chiefly of a little pus, with a considerable amount of clear serous fluid evidently resulting from an irritation caused by the presence of the tube, the tube was entirely withdrawn, and we substituted this short, soft rubber tube which you see in the patient's side to-day. This is open and allowed to drain into a little gauze dressing at the side. The child's temperature varies from normal to 100° F.; the amount of discharge is less than a teaspoonful and is quite thick. She sleeps well, is gaining strength, and complains that she cannot get enough to eat. The expansion of the lung is, as you see, pretty fair. There is still considerable loss of motion below the fifth rib, and mainly on account of the slight pain caused by the tube, and the child's fear of causing pain by motion of the side. She assumes a position which decreases the movement of that side as much as possible, and will, of course, continue to do so until the tube is entirely removed. The history of this case from the period at which the drainage was instituted until the present is much shorter than usual. It is only three weeks since the drainage was instituted. Usually it requires six weeks to secure as much improvement as we have obtained here. One reason for that is, I think, the slight irritation caused by the stiffness of the catheter. It has appeared to me to change the type of the inflammation quicker than the usual course, although that is only an idea which I have gained from watching this case. At any rate, the discharge has diminished more rapidly than I have ever known it to do before. One advantage of this method of drainage is that it allows considerable freedom of the patients. They can change positions, can be moved to a window so as to get fresh air, and can even be carried from one room to another if advisable. One of the chief necessities in the management of these cases is to get them in such a condition that they can be allowed to get fresh air. The sooner they can get out the better, and if they can change their location, even from

one room to another, a natural result is an earlier expansion of the lung and a corresponding lessening of liability to permanent retraction of the lower portion of the lung.

Medicinally, this child has taken nothing but some iodide of iron, and, as you see, she has considerable color and looks pretty well. The soft rubber tube can probably be entirely removed in two or three weeks at most.

This case illustrates fairly well the result of a close operation in empyema in a child. You readily appreciate that it is much more difficult to keep any mechanism of the kind necessary in good working order in a child than it would be in an adult. This was a particularly nervous, irritable child, and yet we have obtained fully as good a result as we should have done had an operation been attempted, if not better.

The advantages of this method are these: It is easy of performance and requires little time; there is no more shock to the patient than by an ordinary aspiration; if properly managed, the drainage can be regulated at will; there is less permanent retraction of the lower portion of the lung than by any other method, consequently less liability to deformity, and there is less confinement incident to this method of treatment. The most experienced operators in cases of empyema express themselves as antagonistic to irrigation, except in a few selected cases, and the general opinion seems to be that it is not safe. This being the case, the chief advantage of free drainage by a double tube or by double openings is lost. Undoubtedly the latter method of drainage will give more free exit to pus and is the proper method for certain cases, as is also resection of the ribs; but that for the type of disease which we have here the method we have pursued is a proper one is, I think, exemplified in this child.

These three cases, then, gentlemen, illustrate the three principal phases of pleural effusions which we are apt to encounter, and so far the results are as good as we may expect to obtain.

Routine treatment in this class of cases is as unscientific as in any other department of medicine: we must adapt our treatment to the exigencies present in the individual case, and I believe it to be as bad judgment to subject every case of empyema to rib-resection as it is to disclaim that the necessity for resection ever arises.

Of the cases under consideration to-day, those of localized collections of fluid in the pleural cavity are the most difficult of diagnosis, and are most apt to be overlooked. The subjective symptoms are frequently confusing, and the physical signs obscure.

These collections are generally found in the lower portion of the pleural cavity, and may consist of one or more compartments containing fluid. This can only be told by the extent to which the abnormal physical signs disappear after aspiration, and by the amount of fluid obtained relative to the extent of the diseased area.

On the left side these collections of fluid are somewhat easier of diagnosis than on the right. On the left side there will generally be a slight displacement of the heart towards the right or upward. As these small collections of fluid are more frequently located anteriorly to the axillary line, this is an important symptom.

On the right side the absence of the above sign, together with the usual modification of the physical signs in the shelving border of lung over the upper portion of the liver, renders the diagnosis of a small collection of fluid difficult. When a small, encysted pleurisy occurs in the posterior inferior portion of the pleural cavity, especially where there is induration of the corresponding lung, the diagnosis is very difficult and can seldom be positive except by the use of the exploring-needle.

The only treatment for these cases is removal of the fluid, no matter how small the collection may be. The pressure in the cavity containing the fluid is such that absorption will seldom take place of itself, and it is often surprising how much relief is obtained by the patient through the removal of a very small quantity of fluid. A young lady who had for three months been suffering from pain in the side, cough, and loss of appetite and of strength, with a daily temperature of 100° F., was last week entirely relieved of these symptoms by the removal of three ounces of fluid from the anterior inferior portion of the left pleural cavity.

I do not admit that all of these small encysted pleurisies are of tubercular origin. Many of them occur in persons in whom it can hardly be admitted. Still these areas where such collections have been found should be regarded as points of minor resistance to the development of tuberculosis, and in the after-treatment should be embraced all such tonic medication and gymnastics of the respiratory apparatus as will improve the strength and nutrition of the embarrassed lung.

Neurology.

PROGRESSIVE MUSCULAR ATROPHY IN A PATIENT WITH VITILIGO.

CLINICAL LECTURE DELIVERED AT THE CHARITÉ HOSPITAL.

BY C. GERHARDT, M.D.,

Professor pub. ord.; Director of the Second Medical Clinic in the University of Berlin.¹

LECTURE I.

GENTLEMEN,—The patient before you is a man thirty-eight years of age. His parents both died very old, the father had been suffering from tremor in both hands. There were seven children in the family. One of his brothers is afflicted with Addison's disease, another is consumptive, a sister has tremor of the hands. He lost his wife by consumption and his only child has scrofulous glands. He himself has passed through various diseases. At the age of eighteen he had a severe attack of pneumonia. His work as a trench-digger frequently exposed him to the effects of moisture and cold. Once he suffered from jaundice with gastric trouble, but without fever. In 1890 he had the influenza. Since his fourteenth year he noticed a curious change gradually developing in his skin, consisting in the formation of white flecks and patches of irregular shape and size. His left arm began to grow weaker a number of years ago, soon after the same change was noted in the left leg, besides, he had shooting pains in the latter from time to time. Questioned further as to his tremor he says that his hands have been trembling for the last twenty years.

Looking at him now that he has stripped down his shirt we find him to present, indeed, a curious appearance (see Fig. 1). On either side the region between the neck and shoulder is occupied by a huge white patch with jagged edges forming a striking contrast in color to the darker hue of the rest of the skin. Between these symmetrical spots

¹ Reported by H. Cleves-Symmes, M.D.



FIG. 1.—Progressive muscular atrophy associated with vitiligo.

there is a smaller one right over the larynx. On the arms the anomaly is most pronounced near the distal end about the wrist. Here, as well as on the legs, a decided preference is exhibited for the extensor aspect, just as in many other skin-diseases. The lower part of the abdomen and the hips also show the affection very plainly (Fig. 1). The pathological process whereby this piebald appearance is induced seems to consist in the pigment shrinking away from certain spots and accumulating in the neighborhood. Owing to the amount of pigment deposited along their margins, the pale spots by contrast appear almost white and show much more clearly than they would were this not the case. The scientific name by which this condition goes is *vitiligo*. As to its cause we have next to no knowledge. It is hereditary in many cases,—that is to say, the tendency, for it is developed in the course of years,—and is often met with in combination with diseases of the nervous system. The patient's family history is very interesting in this respect. The fact of one of his brothers suffering from Addison's disease would suggest that there was running in the blood of this family a tendency of the skin pigment to deviate from the normal.

Even more striking to me is the coincidence of tremor in the father and the sister. I bid the patient stretch out his hands, you see how they shake. The tremor of the head is less visible to those seated at a distance, but they can hardly fail to notice the peculiar stiff manner in which he carries his head, balancing it so as to avoid muscular exertion. We have discussed the different kinds of tremor on former occasions. I described to you the slow creeping motions in athetosis; I pointed out the difference between paralysis agitans, where the tremor is arrested during the execution of willed motions, and multiple sclerosis, where the same circumstances bring it into evidence; I mentioned the senile form, and those tremors that are the consequence of poisoning with alcohol, lead, mercury, and so forth; I also spoke of the tremor encountered as main symptoms in Graves's, or as we call it over here Basedow's, disease; it is less rarely absent there than either struma or exophthalmus.

We have so far in this case found two abnormal conditions: *vitiligo*, which, by the way, in our patient does not embrace the hairy parts of the body, and *tremor*. The latter being in itself not a disease, but merely a symptom, it is our next business to find out what is the underlying trouble. The patient has complained of a decline in physical power in the limbs of the left side. Before examining into this, however, we will find out whether deviations from the normal condition are presented in the sensory sphere. The patient does not complain of

pain, but we are told that at one time in the course of last winter sensation was completely lost in the left leg, coincident with a period of great muscular debility. However that may have been, we find by the usual tests that at present the sense of touch and pain, the perception of heat and cold, is as acute as in any healthy person. What looked like retarded conduction as I touched the soles of his feet is due merely to an unusual degree of local thickening of the skin. The tendon reflexes present no alterations.

Turning now to the motor apparatus, we notice that, though the legs also tremble when they are held out horizontally, yet the tremor is much more pronounced in the arms. The muscles of the arm are, on the whole, well developed. Watching one of them closely, for instance, the right deltoid, you perceive from time to time a long furrow suddenly coming into view and as suddenly disappearing. This is owing to involuntary fascicular or fibrillary contraction within the muscle. The left deltoid shows the symptom even more plainly; you all can see it now that I have affixed a narrow strip of paper as a lever to the muscle. I make the patient raise his arms a couple of times, and the motions of our paper-signal come to be more frequent and of greater sweep in consequence of the preceding muscular exertion. The same result follows upon passive stretching, compression, or any other kind of mechanical insult to the muscle, proving its irritability exaggerated. This is sometimes so marked that a breath of air touching the overlying skin suffices to produce the phenomenon. The triceps extensor, pectoralis major, interossei, and the muscles of the thenar eminence are similarly affected, the latissimus dorsi and the biceps only occasionally. The symptom is thus confined to the muscles of shoulder and arm.

When you place your hand on the left deltoid and feel its consistence, you find the anterior and the posterior third flabby and softer than the median part: it is in them that atrophy usually begins, and this case proves no exception to the rule. I will beg of you now to observe the patient's hand, the right one this time, as it possesses in a more marked degree the features to which I desire to draw your attention. A normal hand resting on a level surface, as his now is on this table, exhibits a fold between index-finger and thumb, close to the latter; between this fold and the first metacarpal the adductor pollicis muscle bulges out as an oblong eminence; in like manner the interossei stand out between the long bones of the middle hand. Now, in this patient's case you find depressions in place of these normal prominences, showing the interossei to be wasted; and the atrophy of the adductor is manifested by a second deep fold close along-side of the index-finger.

To an experienced eye the position of the fingers likewise affords evidence as to the state of the interossei; the basal phalanges are in slight dorsal flexion, whereas the terminal joints are somewhat flexed towards the palm. This is the first step towards developing a deformity going by the name of *main de la griffe*, or "claw-hand," which is more often met with as the result of paralysis of the ulnar nerve. The cause in both cases lies in atrophy of the interossei muscles and consequent contracture of their antagonists, the common extensor digitorum and the flexor digitorum. In the legs muscular atrophy is less apparent, but nevertheless present: there is tremor and loss of power; I should not be able to move a sound person's legs against his will as I do this man's. The tendon reflexes we have already seen to be normal. The atrophy of the deltoid, I may add, has not yet destroyed the practical usefulness of that muscle, the patient is even able still to raise his arms above his head. There is a pretty close correspondence between loss of substance and loss of power. As to tremor, that is a symptom closely allied to fibrillary twitching; we have no satisfactory explanation for either of the two; we merely know that they are both found in diseases associated with considerable muscular wasting. The handwriting is, of course, influenced thereby, although less than might have been expected, owing to a certain knack developed by long habit of seizing upon instants of comparative quiet. Thus he is able to sign his name without betraying his ailment, but when it comes to writing a sentence which he has not so often practised, the lines show that his pen trembles here and there.

The disease of this patient has never been accompanied by fever, and is of an exquisitely chronic nature. After eighteen years of illness he still weighs one hundred and forty-seven pounds; his general state of nutrition has decidedly not suffered in consequence. This is one of the numerous varieties of disease of the muscles that have been made out since Duchenne first called attention to progressive muscular atrophy. Several particular types have been distinguished and given names of their own.

True muscular hypertrophy is one of these: it has been observed especially in the muscles of the neck; a number of fibres in the muscle are found to be hypertrophied and of greater diameter than the rest.

Another type is that of *pseudo-hypertrophy*: it is generally met with in childhood, between the fifth and tenth year; is hereditary, and befalls, as a rule, several children in one family, boys more often than girls. This preference for the male sex is shared by all muscular troubles. The muscles of the trunk and of the legs are mainly

affected. The calves, in particular, are very bulky, but at the same time peculiarly soft. Pieces that were removed from the living subject showed a great increase and preponderance of the interstitial and the fat tissue, which accounted for the discrepancy between power and volume in these muscles.

Another group, which was separated from the former by Erb, is that of *juvenile* dystrophia. Here some of the muscles, like those of the calf, become hypertrophic, whereas others, particularly in the arm, are atrophied. The deltoid in its superior part is hypertrophied, its inferior portion is subject to fatty involution.

But, to return to our case, progressive atrophy begins usually in the hand, befalling the thenar and the interossei, and ushered in by fibrillary twitchings, of which, by-the-by, these muscles in the present case bear evidence. Corresponding to its early onset muscular waste here may attain a very high degree; where the interossei are mainly engaged in the process, we finally see a "claw-hand" developed. I believe I mentioned this before. Where the adductor pollicis is principally involved there the "monkey-hand" is produced, the thumb of which cannot be brought opposite the other fingers. In any case, even before matters have gone that far, the hand ceases to be the cunning tool it was; it is diseased and grooved and distorted, represents in its altered and clumsy condition a mere remnant of its former beauty and usefulness. In right-handed persons this change begins on the right, in left-handed on the left side. From there it extends upward spreading over the lower arm, the shoulder, and the neck. In other cases the disease is first observed in the muscles of the shoulder, deltoid and pectoralis major. This is particularly observed in persons whose daily occupation entails frequent and violent concussion of shoulder and arm,—for instance, in workmen engaged in breaking stones.

There is another great division, *Landouzy-Déjérine*, where the changes originate in the face. The sphincters about the mouth and eyes become inactive, causing the mouth to gape and the eyes to stand half open. This gives the face a peculiarly sleepy expression, which once seen is remembered. The disease thence spreads to the muscles of the neck, the breast, and the arms.

I consider it both simpler and more to the purpose that we rest satisfied with the general name progressive atrophy, adding in each particular case, where the disease began, in the hand, or in the shoulder, or in the face, or wherever else.

The pathological changes encountered in this disease after death have led to much scientific controversy. Charcot and his school main-

tained that a chronic affection of the anterior gray columns of the spinal cord was the cause ; a process of gradual degeneration of the large motor ganglion-cells which translate the message received from the brain, transmitting it to the muscles as motor impulse. It is by them also that nutrition in the subordinate muscular fibres is governed. The changes were thought to be of much the same nature as in infantile paralysis, only more chronic in their development. To atrophy in the cord corresponded atrophy in the muscle, but where the muscles were hypertrophied no similar alteration was detected in the nerve-cells. This view prevailed for a certain time until Lichtheim discovered that cases of chronic progressive atrophy of the muscles actually existed without the nervous system being involved. The disease may therefore be either of neuropathic or of myopathic origin. Our present case belongs to the latter class, which is particularly slow in its progress. Unusual among its features is the fact of its having simultaneously begun in the shoulder and hand ; unusual also is this combination with vitiligo. Analogies, however, are found in different nervous diseases.

I may add that the responses to the electric current of the muscles affected present no deviation from the normal. They are not altered in character, there is no hint of the formula of degeneration. The only change apparent is quantitative. This is readily understood, when we remember that it is from pure atrophy that the muscles are suffering. The muscle as a whole is weakened by the loss of so many contractile fibres, and the individual fibre may be atrophied by the loss of so much substance ; in either case what remains of active substance is normal in character. Being less in amount its electric responses must needs be weaker. I think this the right light in which to regard the matter, putting aside the opinion of some among the extreme advocates of electro-therapeutics, who claim to have unearthed some minute alteration or other.

In connection with this case I am able to show you another man, a little older than the first, suffering from the same disease. In him, however, it has mainly attacked the shoulder muscles. His trade was originally that of a smith, but later on he was engaged as a hod-carrier. This may account in part for the localization of his infection. He was always somewhat addicted to the use of alcoholic liquors.

It is not difficult to see what is the matter with him. The angular bony outline of his shoulder suggests a wasting of the overlying muscles, and when you come to examine with your fingers, you are able to make out the different bones and the joint in a manner impossible in

the normal subject; in fact, you have the feeling as if there were no intervening muscle. The same is the case with the clavicle, there the supraspinous and infraspinous fossa give you the impression of being nearly empty. The deltoid, supraspinatus, and infraspinatus muscles are thus found atrophic. Fibrillary tremor is observed in the upper part of the arm, gradually disappearing as you approach the hand. Sensation is absolutely normal. There is no sign of ataxia. A certain amount of hyperidrosis is present, as is frequently the case in this form embracing the province of the brachial plexus, owing, perhaps, to some lesion of the sympathetic nerves. On the other hand, it may be due merely to the consumption of alcohol. This form, I should say, was the result of chronic poliomyelitis anterior.

The treatment of such cases consists in bodily rest and the use of the galvanic current,—both, of course, for a long time. A number of cases in my private practice have thereby derived great benefit. A complete cure is out of the question. Medicines are of little use, although you will be obliged in the long run, for moral reasons, to prescribe.

MULTIPLE NEURITIS; SPASTIC SPINAL PARALYSIS.

CLINICAL LECTURE DELIVERED AT THE CHARITÉ HOSPITAL.

BY H. SENATOR, M.D.,

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Germany.¹

GENTLEMEN,—This is the patient with multiple neuritis whom you will remember to have seen the day before yesterday. Owing to lack of time we were not able on that occasion to do any more than barely establish the diagnosis. I shall recapitulate in a few words the results of our examination.

He is a man of thirty, whose previous history presents no features calling for particular mention. Four weeks after recovery from an attack of influenza, last March, he became aware of a peculiar pricking and tingling sensation in the legs. Soon after weakness of the legs followed, which gradually grew to be so pronounced that he was no longer able to walk. Lying on his back in bed, he can hardly raise his feet from off the mattress; and yet this is an improvement on his condition the other day. Both tendon and skin reflexes are abolished. Sensation we had found diminished in some places, whereas in others it was increased. Pressure on the nerve-trunks is painful; this is the case with both of the peronæi, both tibiales, and with the left radial nerve. Repeating the same tests to-day, we find him somewhat improved; pricks with a needle on the left leg are felt as such, whereas on the right side he merely feels that he has been touched. The muscles are relaxed and very slightly atrophied. Their mechanical irritability is great. When I deal the tibialis anticus muscle a short sharp blow with my percussion hammer, you see the toes instantly respond, and the point struck bulges out as a prominence that slowly vanishes. Vasomotor disturbances are here absent; in many other cases you are likely to

¹ Reported by H. Cleves-Symmer, M.D.

meet with them in some shape or other. The abdominal muscles promptly respond to a tap with the hammer. The cremaster reflex is preserved on both sides. As regards the upper extremities, we had noted some slight disturbance in the sphere of sensation. He experienced some difficulty in distinguishing plainly by the touch objects that were placed in his hands. A certain amount of ataxy was evident from the manner in which he grasped at objects presented to him. Instead of straightway taking hold of this key, for instance, he carries his hand up close to it with the proximal part of the palm; then, by a sweeping curve of the entire hand, beginning at the wrist, he curls his fingers around the object, and finally pushes it down into the desired position between the first two fingers and the thumb. The idiopathic irritability of the extensor carpi radialis muscle on the left side, and other muscles to a less degree, is augmented; the energy of response to mechanical stimulation proves this. The phenomenon is of a nature purely muscular, not to be confounded with a reflex action in which the nervous system plays a part. The nerves coming from the medulla also appear to be implicated; there is a nasal admixture to the sound of his voice, the velum of the palate is seen to hang down lower on the left side, and for a time he suffered much inconvenience from attacks of hiccoughs, and had some difficulty in swallowing. There is nothing abnormal about his eyes nor about the sphincters of the bladder and rectum.

I need not here in detail go through the electrical examination of the muscles; that would take up too much time. I shall confine myself to a group which is by preference affected in this disease; I mean the muscles governed by the peroneal nerve. The pole being applied to the nerve, you perceive no contraction, although the current would be of sufficient strength under normal circumstances; it is only when I increase the current that the muscles respond. When stimulated directly, the muscles also require a stronger current than would be the case under normal circumstances. This refers to both faradic and galvanic currents. At the same time that you observe this quantitative deviation from the normal, you notice that there is no change whatever in the quality of the contractions; they preserve their usual swift character; there is no sign of the slow and wave-like motion that distinguishes the reaction of degeneration.

The examination of the different systems, all but the nervous, has not resulted in the discovery of anything pathological, nor would such a discovery serve to explain the symptoms of the case. We have not found any signs of disturbance either in the cerebrum or in the cere-

bellum; yet, even if we had, that would not give us a reason for the interference with sensation. The only question that remains for us to answer is, whether the bulbo-spinal cord or the peripheral nerves are diseased. Sometimes this question is rather difficult; in this case, however, we shall not have much trouble.

Our principal symptoms consist in the presence of interference with motor power and of impaired sensation and tenderness of the larger nerves on pressure. Granted that the cord is affected, we should have to assume an entire cross-section to be involved, since motor as well as sensory changes are to be accounted for, the former referring to the anterior, the latter to the posterior part of the cord. Such disease, called myelitis transversalis, is localized in one spot, or there may be several foci; but its distribution, though it may be multiple, is *never diffuse*, each seat of disease being more or less clearly defined from the adjacent healthy tissue. Supposing the lumbar portion of the cord to be subject to pathological action, we should expect to find that all the nerves given off below that level had suffered, both motor and sensory branches; those, however, that leave the canal higher up, and most of all those corresponding to the medulla oblongata, would not be interfered with. The theory of transverse myelitis not holding good, you might suppose the cord to be affected in another manner by systemic disease. This, however, would not account for the coincident presence of changes of both types; an inflammation of the anterior gray matter, poliomyelitis anterior, would explain only motor trouble; whereas poliomyelitis posterior, if such a disease existed, would interfere merely with sensation. This supposition, therefore, is not tenable either. Furthermore, the general character of disease in our case is not of the special type; the sphincters of the bladder and anus do not appear to be interfered with; neither has any rapid atrophy of the muscles been developed.

To summarize the matter in a few words: the diffuse nature of the affection and the presence of symptoms on the part of the spinal bulb exclude transverse myelitis; the combination of motor and sensory alterations does not agree with poliomyelitis; the absence of muscular wasting and of trouble with the sphincters point to a non-spinal character. There is still another feature that I might have mentioned in connection with myelitic disease. The reflex arc for the lower extremities passes through the lumbar cord, the arc for the upper limbs through the cervical cord. Now, if there is a focus of disease at a higher level, it interferes with and weakens or cuts off the inhibitory impulses coming from the brain; exaggerated reflexes are the result;

in our case, on the contrary, they are absent. The fact of some of the nerves that originate in the medulla being involved might suggest the presence of an affection of the bulb. However, the general features of the case and its course do not agree with this assumption; and the tenderness of the nerves contradicts it.

Having thus shown disease of the cord to be improbable, we arrive by exclusion at a diagnosis of *peripheral neuritis*, in this case *multiple*. There are, however, also certain positive signs in favor of our assumption. When I press on the peroneal nerve the patient complains of my giving him pain; in like manner other superficial, and therefore accessible, nerves are found to be unusually tender; this holds good in regard to the musculo-cutaneous, ulnar, median, and crural nerves, as you see. This symptom is characteristic of an affection of the nerves themselves. In some cases you are even able to make out that they are swollen and thickened, but, as a rule, the inflammatory infiltration of their sheaths and interstitial septa requires a microscope in order to be made evident. The muscles are likewise peculiarly sensitive to pressure owing to inflammation of the small branches and the terminal plates of intramuscular nerves. Both these symptoms are absent in disease of the cord.

The cause of polyneuritis is in all cases to be sought in the blood, in the admixture of harmful substances owing to intoxication or infection; that accounts for its multiple nature. It is thus often observed to follow in the wake of *infectious disease*,—diphtheria, typhoid, malarial fever, erysipelas. Of late years it has been quite prominent among the sequelæ of influenza. In this respect it bears a certain resemblance to nephritis, which also occurs from various causes affecting the blood. Infectious disease of unknown origin also plays a great part in the etiology of neuritis, especially beriberi, or kakké, as the Japanese call it. Just as many cases, on the other hand, are the result of slow poisoning, either by substances entering the body from without, such as alcohol, mercury, arsenic, or by intoxication from within by poisons produced in the body itself, by so-called auto-intoxication. In our present case I should ascribe the case to the *influenza* that preceded; the fact of there having been an interval of four weeks is no objection.

In very rare cases, indeed, the urinary organs may be involved in consequence of the sacral plexus being attacked; such accidental occurrence is apt to cause difficulty in regard to the diagnosis. It is also unusual that the nerves coming from the medulla oblongata are affected, as in the case of this man, or that the eye-muscles are involved.

The prognosis of acute multiple neuritis, as a general rule, may be

considered favorable. It is only where the nerves from the bulb are diseased to any great extent, frequently after diphtheria, that life is endangered, either through incapacity to swallow food, or through heart-failure due to trouble with the vagus nerve, or through paralysis of the respiratory muscles.

As to the therapeutics in the beginning, an expectant line of treatment should be followed. I do not thereby mean to say that the patient should be abandoned entirely to his own resources, but merely that the aid of drugs is not called for. Every care must, of course, be given to his well-being, and symptomatic relief afforded so far as possible. As long as motions are painful to the patient, they must be strenuously avoided; he must even be fed by another hand. Baths, in spite of their general utility, are apt at this period to do more harm than good, because of the necessity of moving the patient. In very painful cases you may make use of certain medicines to relieve the pain, such as salicylic acid, or other analgesics, best of all, lactophenine. After pain and fever have subsided, the careful use of the electric current is advisable. Either faradic or galvanic electricity must be used according to which of these produces a reaction of the muscles in each individual case. At a later stage, when the patient has otherwise recovered, if paralysis of any part remains, the time for orthopædic treatment has arrived, so as to correct the resulting deformity. Warm baths are of excellent effect after the acute stage. If your patient can afford the journey send him to Wildbad, Töplitz, Gastein, Ragaz, Wiesbaden, Rehme, or some other watering-place with hot springs.

SPASTIC SPINAL PARALYSIS.

CASE II.—Our next patient is a coachman, thirty-eight years old. He admits having suffered from gonorrhœa and soft chancre at the age of twenty-one, but, from his description, it is quite possible that he really had syphilis. His present trouble began about Christmas, 1893, with attacks of vertigo. He soon experienced a difficulty in walking, his left leg grew weaker, later on the right one also lost strength, till he became unable to be about. He went to the Friedrichshain Hospital, where he was treated by inunctions with mercury. For the last year he has been in one of our wards, and the sojourn appears to have agreed with him, for he has gained sixty-six pounds. For a long while his condition was improved, but of late it has grown rather worse. Thus you find him in bed now, partly in consequence of his disease, and in part owing to his obesity.

He is a strong, robust man. We need not lose time examining

his viscera, as they are quite healthy. There is nothing the matter with his arms. He is unable to raise his legs, which, by the way, exhibit just a trace of œdema. The knee-jerk is greatly increased. When I stretch the tendo Achillis by pushing the toes upward, violent ankle-clonus ensues; I put a stop to it by pressing them downward again. Any effort to flex the legs is met by strong involuntary resistance. This condition of contracture of paralyzed muscles is termed *spastic paralysis*. Looking for further symptoms of nervous disease, we find in the legs sensation very slightly interfered with. Signs of vasomotor disease, such as flushing, cyanosis, hyperidrosis, and the formation of vesicles in the skin, are absent. Nor are there symptoms of muscular wasting of any sort.

I shall now have the patient helped out of bed and supported across the room in order that you may note the typical spastic gait. He drags his feet along painfully, the heels elevated and the toes clinging to the ground, with a shuffling noise at every step. Walking, as you know, consists in falling from one foot onto the other; this man, not being able to bring the second foot forward sufficiently rapidly, nor sufficiently far (owing to the way in which the toes adhere to the floor), would fall on his face if the nerves did not hold him up. These patients in an earlier stage are betrayed by the manner in which they wear through the soles of their boots in front. You will readily understand that every time they rest on their toes ankle-clonus is produced, which explains this peculiarity.

Micturition and defecation were interfered with for a short time, so that we were obliged to resort to the catheter. Now these troubles have vanished. The cutaneous, abdominal, and cremaster reflexes are not diminished. The urine is normal in amount and properties. Of late a shallow ulcer has formed over the left hip, due to repeated injuries in consequence of his clumsiness in getting out of and into his bed. The electrical responses are all normal, but you require a rather strong current to provoke them, because of the deep layer of adipose tissue intervening. Formerly a weaker current was sufficient before he had grown so stout.

Our symptoms, then, consist in three things: in spastic paralysis of the legs, in transitory interference with the bladder and rectum, and in very slight disturbances of sensation. The first of these three makes up a disease that goes by the clinical name *spastic spinal paralysis*. In how far the other two symptoms agree with this we shall presently discuss. Anatomical investigation in these cases reveals degeneration of the pyramidal tracts in the cord. The function of these tracts, as you

know, is to convey voluntary impulses from the cerebral cortex to the muscles. Their course passes from the fronto-parietal or Rolandic region of the hemispheres through the middle part of the posterior crus of the internal capsule, by way of the base of the crura cerebri through the pons, and thence by way of the medulla oblongata to the cord. The greater number of the fibres which compose the pyramid cross at the upper limit of the spinal cord, down which they pass in the posterior part of the lateral column of the opposite side as a compact bundle of fibres occupying in transverse section a somewhat triangular area, which lies in the angle between the posterior horn and the outer surface of the cord, but is for the most part separated from both by fibres belonging to

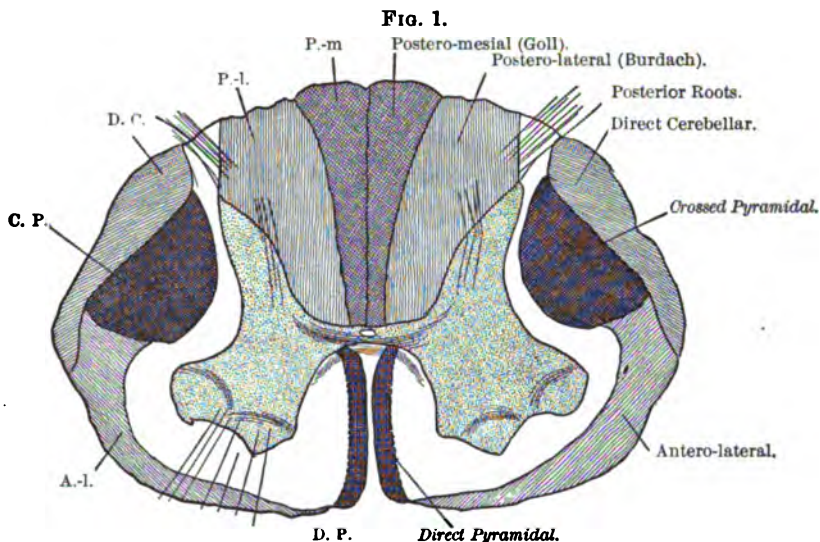
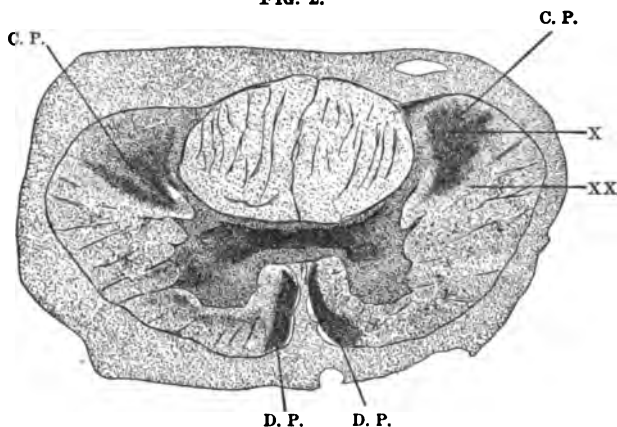


Diagram showing the position of the different tracts on cross-section of the cord.

other systems. This lateral or crossed part of the pyramidal tract can be traced as far as the third pair of sacral nerves, becoming gradually smaller below and approaching the surface of the cord. Some of the fibres of the pyramids of the medulla oblongata do not decussate at the upper limit of the cord. These pass down close to the anterior median fissure, forming the anterior or direct portion of the pyramidal tract (column of Türk), which gradually diminishes as it is traced downward, and usually ceases altogether at about the middle of the dorsal region of the cord. In this disease, now, we find bilateral symmetrical sclerosis of both the anterior and the lateral pyramidal tracts. The place of the degenerated nervous substance is ultimately taken by a

non-nervous fibrillar tissue, which, by its difference of behavior to staining fluids, can easily be distinguished from the surrounding undegenerated white substance. In those microscopical preparations that are being passed round among you, you will have no difficulty in

FIG. 2.



Cross-section of dorsal cord, spastic spinal paralysis, magnified eight times.—C.P., degenerated crossed pyramidal tract; D.P., degenerated direct pyramidal tract. Section stained with carmine.

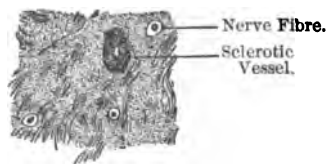
making out the red sclerotic patches. The same kind of change exactly you may suppose to find in the cord of our patient.

According to Charcot and Erb, these symmetrical changes within the pyramidal tracts are the primary and idiopathic outcome of disease.

FIG. 3.



White substance of spinal cord (xx, Fig. 2), normal. Highly magnified. Medullated fibres and septa.



White substance degenerated (x, Fig. 2), sclerotic interstitial tissue, with occasionally a nerve-fibre. Highly magnified.

That is not so, however, if we except those cases that have been developed in consequence of a hereditary or family disposition; all this is merely secondary, the result of some other truly primary trouble that has interrupted the communication between the brain and the parts

degenerated. The pyramidal degeneration thus is secondary and descending, and occurs when the cortico-muscular—the so-called pyramidal—tracts are interrupted at any point of their course. In all cases but one or two doubtful ones, so far, a cause for the symmetrical sclerosis was found by investigation post mortem.

We had at the very beginning of this term a case of brain tumor, which you may remember. The head and eyes of the patient were turned to the side of the tumor, whereas spastic spinal symptoms were confined in the main to the opposite side. Sections of his cord (Figs. 2 and 3), which I submit herewith, show the slight anterior pyramidal tract of the same side, and the lateral mass or crossed tract of the other side, to be sclerotic. In our case, the lesion being bilateral, we must conclude that the primary interference is situated not in the brain, but in the cord itself, or at most as far up as the pons; for beyond that point the tracts of either side diverge from one another, and if we wanted to explain the case by an affection of the brain, we would have to make the assumption of lesions exactly symmetrical in either hemisphere. Such a coincidence by the law of chance might occur once in an age, and in clinical diagnosis we are guided by probability. Independent of this, there is no symptom pointing to an affection within the brain or the medulla. We may further conclude that the interrupting focus of disease does not occupy the cervical portion of the cord, since the upper extremities are not involved.

Having made up our minds as to the presence of some underlying primary affection of the cord, the next thing is to determine its nature. Wounds and gross injuries of any kind are out of the question here, nor are there any local symptoms that might be construed as pointing to tumor. Nothing, then, remains but to assume that this is a case of myelitis. The slow course of the disease argues in favor of this, myelitis being chronic in its nature. As to the etiology, the patient, as you will usually find to be the case, is inclined to attribute his disease to having caught cold. It is possible that he is right, this being one of the recognized causes of myelitis. But we should always proceed *a posteriori*, and the former presence of syphilis being wellnigh established, I do not see why we should not rather rest our diagnosis on this much sounder basis. I have no need to expressly exclude other infectious diseases from the etiology, as none preceded in this case. My diagnosis, therefore, from a clinical point of view, is *spastic spinal paralysis* of *syphilitic* origin; from an anatomical point of view, *chronic dorso-lumbar myelitis* of syphilitic origin.

Having made out this much, we may go yet one step further, and

try to glean some detail as to the nature of this syphilitic process. We have the alternative of vascular or gummatous disease to choose between. The former, *arteritis obliterans syphilitica*, consists in a gradual thickening of the coats of the vessels, both externally and internally. The canal thus gradually becomes blocked, a development that is further favored by cicatricial shrinking of the outer ring of newly-formed tissues. You see that this process is admirably calculated to set up destructive chronic inflammation in the parts affected. The second shape which syphilis here may assume is that of gummatous meningo-myelitis. The seat of disease generally lying along the posterior aspect of the cord, the sensory nerve-roots are apt to suffer by compression, and sensory symptoms occur early and occupy a prominent position in the history of the case. The only other feature, besides this prominence of sensory interference, that may be considered as characteristic in any way of syphilis is the discontinuous march of the disease, which progresses by fits and starts, therein resembling other syphilitic affections. However justly these two distinctions, the prevalence of sensory symptoms and the lack of continuity may be vindicated for the average of cases; that does yet not mean that they must of a necessity occur in each individual case. If it were not for the clue afforded by the previous history they would hardly have been of diagnostic value in the present case. As regards the differentiation between the two forms of syphilitic spinal paralysis, sufficient data are lacking.

The sensory disturbance and the interference with the functions of the bladder and the rectum, both of which existed at one time, do not agree with Charcot's theory of primary systemic sclerosis, presupposing the existence of spastic paralysis, pure and simple, with no complication. But as this theory is almost universally abandoned, the matter is explained by all these affections, spastic paralysis included, standing on a par as symptoms of the same primary myelitis.

As a rule, the disease keeps on its way in a very chronic manner, although sometimes it is arrested in its course at some point or other. I have a patient with well-marked spastic paralysis, but with no symptoms on the part of the bladder, whose condition became stationary years ago and has remained that way ever since. He has married in the meanwhile and has even had several children. Very generally the patients complain of constipation; I do not venture to decide whether this is due to paresis of the intestinal muscles or whether it is the result of insufficient bodily exercise. The disease very rarely extends to the upper extremities. It is never associated with fever

unless the latter is owing to cystitis, or bed-sore, or some other complication.

The affection belonging purely to the nervous system, and not involving the internal organs, the patients may keep on living for many years in spite of it and enjoy good health in all other respects. As they can take but little exercise, the appetite not being impaired, they generally grow very stout, as in the present case. That is not a thing to be desired, for it interferes with the circulation and gives the paretic legs a heavier load to carry, the patients in consequence are much more hindered in their locomotion than would otherwise be the case. Death finally, when owing to the disease, is owing to it in an indirect manner, occasioned by secondary affections, such as cystitis, pyelitis, bed-sores, etc. The prognosis *quo ad vitam* is not unfavorable, *quo ad restitutionem*, however, is decidedly bad. It varies, of course, according to the nature of the primary trouble, and according to its situation ; besides, it is very difficult to make sure in this respect.

The treatment is rather powerless on the whole. If you are fortunate enough to see a case at an early stage, you should apply ice along the spine, cup and purge the patient, and keep him absolutely quiet in a recumbent position. You sometimes thus succeed in cutting short the disease, before the ill-defined initial symptoms allow of making a sure diagnosis. If you are sure of syphilis in a case, you may to advantage use inunctions of mercury. Cases are on record, where a complete recovery was effected by this means. At a later period the use of iodide of potassium is indicated ; this should also be tried, where syphilis is not at the bottom, with a view to bringing on absorption of diseased exudative matter. Finally, warm baths should be used here as well as in all other cases of paralysis. The patient can either take them at his home, or go to some watering-place ; the effect is substantially the same in both cases.

THE LOCALIZATION OF LESIONS IN THE PONS AND PREOBLONGATA.

CLINICAL LECTURE DELIVERED AT THE PHILADELPHIA HOSPITAL.

BY CHARLES K. MILLS, M.D.,

Professor of Mental Diseases and of Medical Jurisprudence in the University of Pennsylvania; Neurologist to the Philadelphia Hospital, etc.

GENTLEMEN,—During this and the last lecture term I have shown you a number of cases of disease of the cranial nerves and of the pons and oblongatas. Several of these cases have died, and you have seen how closely the focal diagnosis of a small gross lesion in a restricted and structurally complicated region can be diagnosticated. The gross specimens, microscopical sections, and drawings from one of these cases were exhibited during the last term, and to-day I show you also the

FIG. 1.

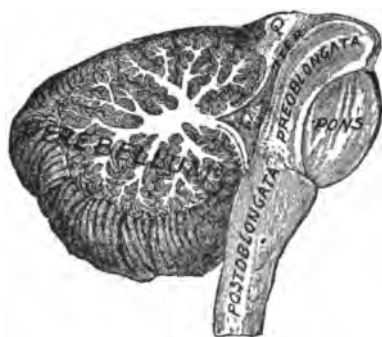


Diagram showing the relations of the pons, preoblongata, and postoblongata to the fourth ventricle, iter, gemina, and cerebellum: Q, quadrigeminal body; V, fourth ventricle.

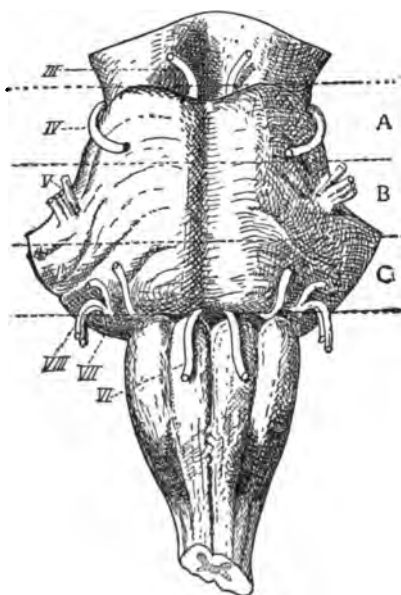
specimens, with photographs and drawings, of another case. Both of these cases are illustrations of localized pontile softening, such as would be expected from destructive lesions. Both involved important longitudinal and transverse tracts and the root-fibres of certain cranial nerves. The lesions were small but deeply situated.

With Wilder, I prefer to restrict the term pons to the somewhat cylindrical body occupying a ventral or inferior position in the cerebro-spinal axis between the crura and the postoblongata,—usually termed the medulla oblongata,—applying the term preoblongata to the important strip of nerve-substance between the pons proper and the fourth ventricle, its dorsal surface being the floor of the ventricle. The nuclei of the cranial

nerves, from the fourth to the twelfth, are situated in the oblongatas. The pons proper is largely made up of fibre tracts, but it contains also a few special nuclei. In Fig. 1 are shown the relations of the oblongatas to each other, to the pons, and to the fourth ventricle.

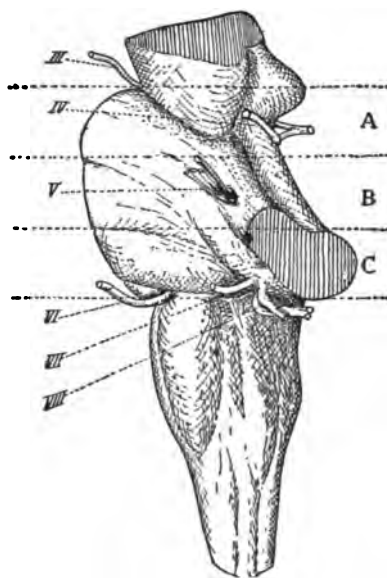
For the purposes both of focal diagnosis and description it is well to have some readily applied topographical scheme. The common method of dividing parts into thirds is convenient and useful. The Rolandic or motor region of the cortex, for instance, is frequently referred to with relation to the upper, middle, or lower thirds of the

FIG. 2.



Subdivision of the ventral aspect of the pons into thirds, showing the relations of important structures to each subdivision.

FIG. 3.



Subdivisions of the lateral aspect of the pons and preoblongata. The nerves are indicated by the Roman numerals.

central fissure, and convolutions and lobes are often divided into thirds in describing the positions and extensions of lesions. By dividing the combined pons and preoblongata into thirds in two directions, we are able to focus our attention upon any one of nine segments. The diagnostician must know the gross anatomy of this region, and to some extent he should be familiar with its nuclei and fibre systems, as shown in microscopical sections.

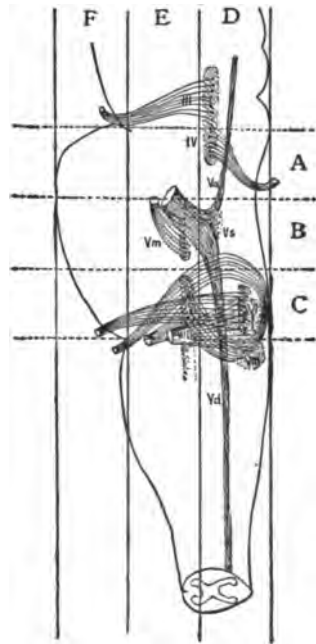
I have here ventral, lateral, and dorsal views of the gross appearances presented by the pons and preoblongata (Figs. 2, 3, and 4), represented as divided into thirds by horizontal dotted lines. The lines

to pass with our mental vision beneath the surfaces of the bodies we are considering. Let us first glance into or just beneath the floor of the fourth ventricle. With the aid of Fig. 5, which is largely diagrammatic,—the relations of the parts being, however, as in actual specimens,—the positions of the nuclei of the third, fifth, sixth, seventh, and eighth nerves are made evident. The nuclei of the third nerve are situated in the gray matter along the course of the Sylvian aqueduct, cephalad of subdivision *A*, and the nucleus of the fourth nerve adjoins the nuclei of the third in the upper portion of this cephalic segment, lying chiefly beneath the postgeminum. Both the sensory and motor nuclei of the fifth nerve are in the middle third, while the nuclei of the sixth and seventh and a large part of the eighth are in the caudal or lower third. Hence, when nuclear symptoms referable to any one or more of these nerves are present, the topography of the lesions causing them can be understood and readily stated with reference to these subdivisions.

The root-fibres of the nerves which spring from these nuclei have, it must be remembered, within the substance of the preoblongata and pons, courses of considerable extent and complexity before they appear on the ventral and lateral aspect of the pons. In Fig. 6 a general idea is given of the dorso-ventral routes pursued by the root-fibres of the third, fourth, fifth, sixth, seventh, and eighth nerves. In this illustration new lines are shown, drawn longitudinally and at right angles to those already used in making the subdivisions *A*, *B*, and *C*; thus giving in lateral view nine segments, the thirds *A*, *B*, and *C* each being subdivided into thirds,—three ventral, three dorsal, and three intermediate (that is, intermediate between the dorsal and the ventral segments).

The root-fibres as well as the nuclei of the third nerve chiefly lie cephalad of all the above subdivisions. In the cephalo-dorsal third it will be seen that the root-fibres of the fourth nerve and that branch of

FIG. 6.



A lateral diagrammatic view of the course of the root-fibres of the cranial nerves from the third to the eighth. The diagram is shown subdivided into thirds longitudinally (D, E, and F) as well as horizontally (A, B, and C).

the fifth formerly called descending, but now known as the ascending branch, pursue their way. In the dorsal and intermediate segments of the middle third (*B*) both descending and ascending roots of the fifth nerve are seen, as are also a few of the curving fibres of the curiously twisting roots of the seventh nerve; while in the dorsal and intermediate segments of the caudal subdivision (*C*) are crowded the root-fibres systems of the sixth, seventh, and eighth nerves.

Making now dorso-ventral sections through the middle of each of the subdivisions *A*, *B*, and *C*, the appearances of such transections, as seen under low powers of the microscope, would be much as shown on each half of Figs. 7, 8, and 9. Fig. 7 shows the appearance of a section through the middle of the subdivision *A*, Fig. 8 of one through the middle of the subdivision *B*, and Fig. 9 of one through the middle of the subdivision *C*. In these figures are brought into view not only the appearances in section of the root-fibres and nuclei of the nerves, but also of various important longitudinal and transverse tracts,—the superficial and deep transverse fibres of the pons, the pyramidal tract, the fillet, the peduncles, some of the most important of the cranial nuclei and root-fibres, and certain special nuclei and tracts, as the superior olive, the lateral nucleus, the dorsal longitudinal bundle, and the central tegmental tract.

The merest glance will show that in all positions the most important parts involved in lesions of the ventral and of the intermediate segments will be the superficial and deep transverse fibres and the pyramids. The fillet lies about the junction of the intermediate and dorsal segments, varying in its median and lateral positions in different cephalocaudal sections. Nuclei and root-fibres are most prominent in dorsal segments.

The pyramidal tract dominates the symptomatology of ventrally situated pontile lesions, its destructive lesions, no matter where situated, giving certain uniform symptoms, and others which will vary somewhat according as the lesion is more cephalic than caudal, or the reverse. It is the great tract from the motor region of the cerebral cortex. In the mid-brain it gives off fibres which cross to the nuclei of the third and fourth nerves of the opposite side. In its course through the pons it sends fibres to the cell-nests of the motor fifth and of the abducens and facial nerves; but throughout its entire course, until the spinal cervical cord is reached, it contains the fasciculi for the arm and leg of the opposite side. Hence destructive lesions of this tract will always give paresis or paralysis of the opposite extremities. When the lesion is in the cephalic portion of the pons, before the decussation of the pyrami-

dal fibres for the trigeminal, abducens, and facial nerves, some ocular and especially some facial paresis may be present. This loss of power in the face must be distinguished from that caused by lesion of the facial root-fibres or nuclei. The paralysis of the face is central, and has features similar to that shown in the arm and leg. It is usually incomplete, although it may be more marked than when caused by a lesion situated higher in the pyramidal tract or in the cortex. It does not give the electrical reactions of peripheral facial paralysis.

Irritative lesions of the pyramidal tract in the pons and elsewhere may give rise to monospasm, or even to unilateral convulsions, chiefly affecting the limbs and face of the opposite side.

Often, in lesions of the ventral portion of the pons, the cranial nerves at, just before, or just after their superficial origins will be involved, giving various forms of so-called *alternate hemiplegia*. In lesion of the lower ventral third, or conjointly of the ventral and lateral thirds, the alternate hemiplegia will be of the arm and leg of the opposite side, and may be of the face on the same side; or facial, abducens, and auditory nerve paralysis of the same side may coexist with the paralysis of the extremities. In the middle ventral third, especially if the lesion extends laterally, paralysis of the leg and face

FIG. 7.

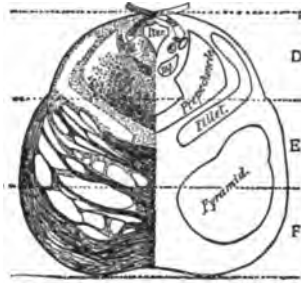
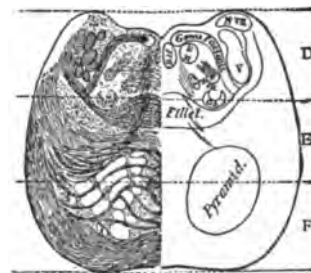


FIG. 8.



FIG. 9.



Transections of the pons and preoblongata about the middle of each of the thirds A, B, and C, represented in the previous diagrams. The thirds D, E, and F correspond to the similarly designated thirds in Fig. 6. These figures show the relations and position of the most important structures: *O.S.*, superior olive; *C.t.*, central tegmental tract; *L.c.* and *c.*, locus ceruleus; *D.L.f.*, dorsal longitudinal fasciculus; *L.f.*, lateral fillet; *L.n.*, lateral nucleus; the numerals refer to nerve nuclei and roots.

of the opposite side may be associated with both motor and sensory paralysis in the distribution of the fifth nerve. In the cephalo-ventral segment the lesion may extend so as to implicate the third nerve, giving the oculo-motor type of alternate hemiplegia, or some paralysis of the third and fourth nerves may show on the same side.

The superficial transverse fibres of the pons which lie ventrally to the pyramids contain chiefly cerebellar fasciculi. In the middle third of the pons they run nearly horizontally, having a more oblique course in the lower and upper thirds. They connect special portions of opposite halves of the cerebellum, and also portions of the lateral lobes of the cerebellum with the opposite cerebral hemispheres. The symptoms given by lesions of special bundles of these superficial transverse fibres are not yet thoroughly known. I have reported a case in which, apparently as the result of a small hemorrhage involving these fibres, as well as some of the deeper parts of the pons, the patient had atrophy of one lateral lobe of the cerebellum and of the opposite hemiserebrum.

Passing to the intermediate segments, as seen in the transections Figs. 7, 8, 9, it will be seen that the pyramidal tract occupies part of this region, which also contains the *deep transverse fibres* and, near the junction of the intermediate and dorsal thirds, the fillet. A lesion centrally situated in the substance of the pons will, therefore, give symptoms the result of the destruction of these deep transverse fibres, and, if the lesion extends ventrally and dorsally, of both the pyramidal tract and the fillet. The deep transverse fibres constitute largely the structure known as the *trapezium* or *trapezoid body*, whose size and position show its physiological importance and the necessity of giving it a place in clinical diagnosis. Flechsig, Bechterew, Hans Held, Bruce, and others have shown that in it is the path of the cochlear nerve, which branch of the eighth pair is the true nerve of hearing. Fibres of the trapezoid body pass to the various auditory nuclei, and also to the roof nucleus of the cerebellum, and connect with the superior olives both of the same and of the opposite side. According to some authorities, the trapezoid fibres unite with the fillet, and according to others, they intersect it. While the lower or caudal border of the trapezium corresponds nearly to the same border of the pons, cephalad it only reaches as high as the place of emergence of the sensory root of the fifth nerve, and, therefore, it would be chiefly involved in lesions of the two lower thirds of the pons, as given in the diagrams.

The superior olive, which extends the whole length of the pons, is closely approximated to the dorsal surface of the trapezium, and is located, therefore, near the junction of the dorsal and intermediate

segments. Bechterew believed that the superior olive acted as a reflex centre for correlating the movements of the head and eyes with auditory impressions, and its lesions might therefore be expected to interfere with such correlations, causing a lack of response by the head and eyes to sounds coming from various directions. The connections of the superior olive which have been traced are with both accessory nuclei of the auditory nerve, with one or possibly both cerebellar roof nuclei, with the nucleus of the sixth nerve on the same side, with the dorsal longitudinal fasciculus of the opposite side, with the lateral columns of the cord, and with the postgeminum.

As the fillet, or at least its most mesal portion, is a part of the great sensory tract, its lesions cause disorders of sensation. Numerous cases have been reported in which deeply situated pontile lesions have given rise to anaesthesias, and especially to impairment or loss of the senses of pain and temperature ; and numerous studies of degeneration following focal lesions have also shown the part played by the lemniscus as a sensory tract. The acoustic tract runs in the lower lateral division of the fillet to the postgeminum, so that lesions of the lateral fillet, like those of the trapezoid body, should give affections of hearing.

In the dorsal or preoblongatal portion of the region we are considering the structures are complicated. Here in various positions are the nuclei and root-fibres of the fourth, fifth, sixth, seventh, and eighth nerves ; and, in addition, certain special fasciculi, as the dorso-longitudinal bundle and the central tegmental tract. Dorsal lesions in different fore-and-aft segments will, therefore, give varying forms of paralysis of the face ; of trigeminal paralysis, motor and sensory ; and of single or associated ocular palsies. As the third, fourth, and sixth are all nerves to the ocular muscles, and as in various movements of the eye these muscles act to a greater or less extent together, both on the same side and across the median line, the nuclei of these nerves must be anatomically connected, and lesions of their associating and correlating fibres will give special disorders of ocular movements. Some of the connections, it is believed, are by the dorsal longitudinal bundle.

Many of the curving strands in the pons and oblongatas run from the nuclei of the motor cranial nerves, partly to the opposite dorsal longitudinal bundle and partly to this fasciculus on the same side.

Bechterew, Edinger, and others have demonstrated a *central tegmental tract*, beginning near the dorsal accessory nucleus and passing cephalad in the mid-tegmentum. In one of my cases of thalamic disease with involvement of the superior limb of the internal capsule,

this tract with both inferior olives was found to be markedly degenerated, showing that it probably reaches to and even beyond the inter-brain. According to Bechterew, it terminates in the lenticula. The position of this tract, according to Edinger, is shown in Fig. 9 (*C. t.*). This tract may serve to correlate the cell-nests of the sensory cranial nerves, as the dorsal longitudinal fasciculus does those of the motor.

Let me now enforce some of the points which I have endeavored to make with reference to segmental localization in the pons, by reference to recent and past clinical experiences in this hospital and elsewhere. Here are the photographs of Case I., one of the patients referred to at the beginning of the lecture (Figs. 10 and 11). He died a few weeks since. When he was brought before you the diagnosis was made of a lesion involving the abducens root-fibres and pyramidal tract in the pons.

This man had a history of syphilis. Eight or nine months before his death his left eye showed a tendency to turn inward, and for a time he saw double, and occasionally he had spells of vertigo. His left extremities were weaker than the right. He was extremely emotional, and often laughed or cried without motive or incitement. (See Fig. 11.) No anæsthesia was ever determined, but both legs seemed to be rather hyperæsthetic. Knee-jerks were exaggerated, especially on the left; muscle-jerks were also increased, and ankle clonus was present on both sides. The plantar reflexes were marked.

His vision was reduced to about one-half in the right eye and one-third in the left, but his fields could not be determined. The retinal arteries were small. Accommodation was good. The right external rectus muscle was paretic, the left was paralyzed, and ocular movements were restricted in accordance with these conditions.

I omit many details in this case unnecessary for our present purpose. The man, before death, developed gradually increasing mental and paralytic symptoms.

On autopsy, the lesion which chiefly concerns us in the present connection was found in the pons. A transection through the pons within the limits of subdivision *B* of our diagrams revealed a ventral lesion near the median line in the right half, which appeared to be limited, as shown in the drawing, Fig. 12. Subsequently, microscopical sections were cut and mounted by Dr. A. O. J. Kelly, from which drawings, shown in Figs. 13 and 14, were made by Dr. J. C. McConnell. These show that the area of softening and surrounding degeneration extended much farther than appeared in the fresh specimen. It reached to a considerable distance on both sides of the



FIG. 10



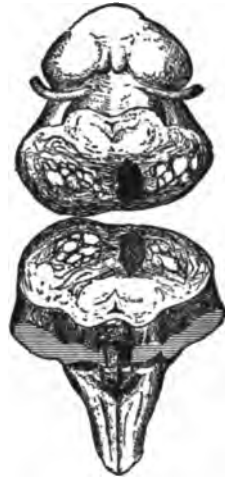
FIG. 11.

Case of pontile lesion (Case II.): Fig. 10 shows paralysis of the external rectus and expression of the face at rest; Fig. 11 shows the patient's expression at the time of uncontrollable emotional disturbance.

median line, as shown in both drawings by the lighter areas. The destruction and degeneration involved both pyramidal tracts, the deep transverse fibres, and to a less extent the superficial transverse fibres. The root-fibres of the right abducens, and to a large degree those of the left, were also probably implicated. The destruction was much greater on the right than on the left side, causing a large shrinkage in general bulk on the right. The paralysis and paresis of the extremities were due to the involvement of the pyramidal tracts. Implication of the abducens root-fibres caused the ocular paralysis of one side and the paresis of the other.

CASE II.—Last year a case of pontile lesion was shown to the class, and reported at the meeting of the American Neurological Association by Dr. John Zimmer and myself. The day before admission to the hospital the patient was attacked with vertigo, double vision, and paresis of the right arm and leg. She had imperfect articulation; at rest the right eye turned strongly to the right, while the left was not deviated; both eyes could not be turned together to the left; the lateral movement of the left

FIG. 12.



Drawing showing the position and apparent size of the pontile lesion in the fresh specimen from Case I. in the text, and illustrated in Figs. 10 and 11.

FIG. 13.



FIG. 14.



In Figs. 13 and 14 are shown the microscopical appearances of the lesion in Fig. 12. The degeneration is seen to extend across the median line and over a large area.

eye to the right was also impaired, and slight nystagmus of both eyes was present. The lids of the left eye could not be fully brought together. Right facial paresis was present. Tendon and muscle phe-

nomena were much exaggerated in the paretic limbs. No anæsthesia was discovered. As determined at the autopsy, the pontile lesion was a circumscribed softening with hemorrhagic infiltration, reaching at its cephalic extremity nearly to the ventral surface of the pons, more caudally extending towards the raphe, and about the middle of the pons slightly crossing the mesial line. The area of softening

FIG. 15.

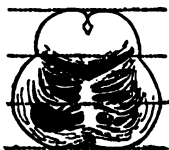


FIG. 16.



FIG. 17.



Figs. 15, 16, and 17 show the position of the pontile lesion in Case II., described in the text, the sections being through *A*, *B*, and *C* of Fig. 18.

FIG. 18.

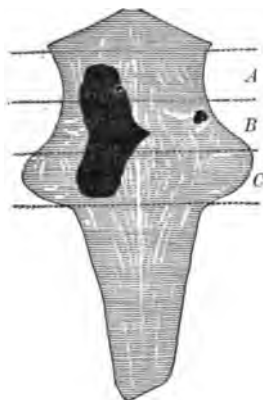


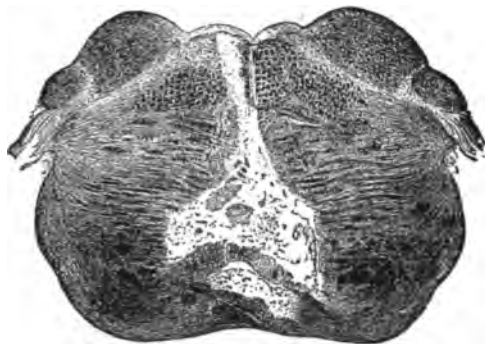
Diagram showing the antero-posterior dimensions of the pontile lesion in Case II.

became smaller and more deeply situated as it approached the post-oblongata, which it almost, but not quite, reached. Drawings were made by Dr. Zimmer of the appearances presented at the time of the autopsy, and Figs. 15, 16, and 17 give a good idea of the

position and apparent extent of the lesion as then noted. Fig. 18 shows that the longitudinal extent of the lesion was such as to involve, on the left side of the pons, all three of our subdivisions *A*, *B*, and *C*. The three transections from which the other figures are drawn would have fallen respectively within our subdivisions *A*, *B*, and *C*, but not exactly in the planes represented by the transections of normal structures (Figs. 7, 8, and 9). It was found on microscopical investigation that the area of destruction and degeneration extended for a considerable distance beyond the lesion as it appeared in the fresh state, reaching both across the median line and in other directions, as shown in a drawing by Dr. J. C. McConnell (Fig. 19). At one

position close to the median line it reached almost to the floor of the ventricle.

FIG. 19.



* Microscopical appearance of a transection through the lesion in Case II.; the section was made through the middle third of the lesion in about the position shown in Fig. 16.

Years ago I published the account of a case of tumor of the pons, in which the chief symptoms of focal lesion were hemiparesis, partial right ptosis, diminished sensation on the left side of the face and right limbs, conjugate deviation of the eyes and rotation of the head to the right, persistent epistaxis, and a tendency to hemorrhage from the mucous membranes. The autopsy revealed a gumma about half an inch in diameter, distinctly limited to the left cephalic quarter of the pons.

Another case of central softening of the pons has also been reported by me. None of the cranial nerves were superficially involved, although the lesion was unusually large. The clinical history showed headache, a vertiginous seizure followed by partial right hemiplegia, left convergent strabismus, defective articulation, and paralysis of the left arm three weeks after the attack; another seizure, accompanied by great emotionality, profuse perspiration, difficulty in breathing and swallowing, inability to speak and to thrust out the tongue or open the mouth wide, and paralysis of both arms and legs; and at the last conjugate deviation to the right.

Conjugate deviation of the eyes and head is a not infrequent accompaniment of lesions, and especially of tumors towards the cephalic extremity of the pons. Vaso-motor phenomena, such as pallors, flushings, and the epistaxis and mucous hemorrhages referred to above, may be present in pontile lesions, as may also special temperature changes. These are probably due to implication of vaso-motor and heat centres; but time will not permit the discussion of the entire subject of pontile lesions in this lecture.

Thus far in the cases to which I have called your attention the diagnoses have been confirmed by autopsies. Recently a patient of peculiar interest in connection with my lecture was admitted to the men's nervous wards,—an excellent example of conjoint trigeminal and facial paralysis, with some impairment of hearing. He is a young man of about twenty-six years of age, with a history of syphilis. About two weeks before admission he observed that the right side of his face was paralyzed and insensitive. When admitted, examination showed complete paralysis of the right facial or seventh nerve, also of the muscles supplied by the motor division of the fifth nerve. The patient was also anæsthetic on the right side of the face, including the conjunctiva and cornea. The hearing, as determined by the watch, was good on the left side, but on the right it was necessary to bring the watch close against the ear before its tick could be heard. He had, however, no tinnitus. Taste was lost on the right side both on the anterior and posterior portions of the tongue. He had neither paralysis nor anæsthesia of any part of the body below the neck. The symptoms in this case are probably due to a lesion of the lateral aspect of the pons, although they might be explained by a lesion within the substance of the pons and preoblongata, so situated as to injure or destroy the sensory and motor root-fibres of the fifth, the facial and glossopharyngeal root-fibres, and some of the acoustic root-fibres, or perhaps fibres of the auditory tract in the trapezoid body or lateral fillet. The electrical reactions in the muscles of the face were those of peripheral paralysis.

PARALYSIS FROM SHOCK.

CLINICAL LECTURE DELIVERED AT THE CITY HOSPITAL, INDIANAPOLIS, INDIANA.

BY W. H. THOMAS, M.D.,

Professor of Diseases of the Nervous System, Central College of Physicians and Surgeons; and Consulting Physician to the City Hospital and City Dispensary.

LADIES AND GENTLEMEN,—I bring before you to-day a young lady who was severely injured some three months since by falling down an embankment. The history of the case, as obtained from those that attended her, shows that she was unconscious for about an hour after she fell. When consciousness began to return, she coughed and vomited, and in that way discharged quite a quantity of blood. It was ascertained afterwards that the blood came from the rupture of a blood-vessel about the juncture of the middle with the upper third of the right lung. Several times since the injury there has been slight hemorrhage from this place, but it is less in quantity at each recurrence. As soon as consciousness had returned, it became apparent that the right side of the face and the right arm were partially paralyzed and that the right leg was completely paralyzed. This paralysis was of both motion and sensation. There were some bruises on the right arm and shoulder, but a careful examination failed to reveal either a fracture or a dislocation. For some time after the injury was received there was a slight rise in temperature, but this soon subsided, and the paralysis of the face and arm disappeared. From the first the patient was restless, wakeful, and nervous, and this nervousness has increased rather than diminished. You see that when I make pressure over the spinous processes of the vertebra there is extreme tenderness in the lower cervical and upper dorsal region of the cord, and this tenderness extends the whole length of the spinal column. It is most pronounced at the first point named and at the upper part of the lumbar region. At this time there is a general hyperæsthesia of the whole surface of the patient, except in the right lower extremity, and in it there is no sensation. You see me press the points

of the æsthesiometer upon the leg until the blood starts, and there is not the least sign of sensation. Measurement of the two lower extremities shows that there is no atrophy of the muscles. The bowels are regular, and there is no derangement of the urinary organs. She complains of occipital headache, and the appetite is not good. The digestion is imperfect, and there is palpitation of the heart. These are the symptoms in this case, and from them we must ascertain the nature of the injury. The paralysis of the lower extremity should first engage our attention.

Is it from an injury of the brain or of the spinal cord, or is it from an injury of the nerves after they have left the cord, or is it a functional derangement? When paralysis immediately follows an injury of the brain or cord, it must be from either a laceration or a compression of one of those structures. There has been no fracture of any of the cranial bones, so pressure or laceration from that cause can be dismissed. If this paralysis had been from hemorrhage of the brain, the hand and arm would have been the most profoundly affected. When recovery had commenced, as it has in this case, the leg would have recovered first and most rapidly. If there had been meningeal hemorrhage that would produce so much paralysis, there would have been profound coma, followed by death, or there would have been severe headache and the other symptoms of meningitis. I think we may safely dismiss injuries of the brain. If there had been a fracture or dislocation of a vertebra, or if there had been a hemorrhage into the substance of the cord or its meninges that would produce complete paralysis of motion and sensation in one side, there would have been some loss of sensation in the other side. The bowels would have been paralyzed, and there would have been either obstinate constipation or involuntary evacuations. There would have been a girdle pain and the muscles would have shown some degree of atrophy. The symptoms do not warrant us in believing that there is an injury of the cord. If the continuity of the nerves passing from the cord to the leg were destroyed, there would be such a paralysis as there is in this case. Careful examination shows that there is no wound or injury that would destroy the continuity of the nerves. There are quite a number of functional diseases of the nervous system in which there is no lesion of any structure, and yet there is abnormal or suspended action. In this case there was a suspension of the mental functions for over an hour, and yet there is no lesion of the brain. When the suspended mentality had passed off, paralysis of the face, arm, and leg remained. After some time the suspended action of the hand and face disappeared,

but the paralysis of the lower extremity still persists. Then this is a functional paralysis, a suspension of action.

Aside from the paralysis there are some symptoms which claim our attention. There are occipital headache, palpitation of the heart, indigestion, and nervousness, which are sometimes extreme.

There is tenderness on pressure over the spinous processes of the vertebræ, most prominent over the cervico-dorsal and the lumbar regions of the cord. These are the symptoms that are present in spinal irritation. Spinal irritation is caused by a defective nutrition of the cord. There is a deficiency either in the quantity or quality of the blood supply to that part. Then spinal irritation is a functional disease. When an injury has been received producing the conditions that are found here, and an examination proves that there has been no injury to the brain or spinal cord, the student of medicine naturally inquires, What change has taken place? Why do we have insensibility, why is there paralysis, and why does death sometimes occur from causes that leave no trace that they have ever been? We may say that unconsciousness occurs from an anæmic condition of the brain, but why is the blood supply to the brain deficient? Concussion and shock are terms that we often find in medical literature, but it is not often that any one stops to inquire as to the results of either one of these accidents on the nervous system. Concussion is defined as the violent shaking together of a part, and when this part is the brain or spinal cord, one or more of the nerve-cells may be affected so as to alter or destroy their function. To illustrate this condition I will call your attention to the fact that a severe thunder-storm will destroy the germinating power of an egg, and yet if you examine the egg, even with the microscope, no defect can be found. Following concussion of the brain or cord there is often an inflammation or degeneration occurring on account of the defective or suspended action of a part of the nerve-cells. Inflammation occurs in a few days or weeks after an injury of the cells from concussion, while the degenerative diseases may not make their appearance for months after the accident has occurred. Concussion of the brain or cord is not followed by immediate paralysis.

Shock is a condition of profound prostration of voluntary and involuntary functions, acute in its onset, and caused by injuries, surgical operations, or sudden emotional disturbances, such as grief, alarm, indignation, horror, or joy. Its effect is a partial or complete arrest of a part or all of the nervous functions. It ranges in severity from a momentary pallor of the face to the complete suspension of all nervous

action, which terminates in death. The results of shock are various as to their after-effects on the patient's condition. In some cases recovery is quick and complete, while in others recovery never comes. It has caused premature labor, stopped the secretion of milk, arrested the menstrual flow, caused jaundice, and in persons in the prime of life it has turned the hair white in a single night. It has produced temporary delusions and hallucinations, paralysis and insanity. It may produce an inflammation or degeneration of a sympathetic nerve centre. Shock is attended by coldness of the surface, pallor of the face, and a feeble pulse. To these conditions may be added tremors, a wild expression of the face, a partial or complete paralysis of any organ or part of the body. Its effects are produced through the sympathetic nervous system reflected to the cerebro-spinal centres. Shock is to the sympathetic centres what concussion is to the cerebro-spinal centres. Its effects on the sympathetic centres may be as severe and far-reaching as is concussion to the cerebro-spinal centres. How was unconsciousness produced by shock in this case? It is a well-known fact that, if the abdomen of a frog be laid bare, and the intestine be struck a sharp blow with the handle of a scalpel, the heart will stand still in diastole, with all the phenomena of pneumogastric inhibition. In this experiment the shock produced by the blow causes irritation of the sympathetic centres in which fibres of the pneumogastric nerve terminate. This irritation passes up the pneumogastric nerve until it reaches the medulla, causing a reflex inhibition of heart action. At the time the accident occurred to this young lady, the shock to the pulmonary sympathetic centres must have been severe, for the concussion of the right lung was sufficient to rupture a blood-vessel. Fibres of the pneumogastric nerve terminate in the pulmonary sympathetic centres, and by reflex action there was cardiac inhibition which produced anæmia of the brain, hence the insensibility.

Faradizing the communicating branches of the intra-thoracic chain of sympathetic ganglia produces contraction of the blood-vessels of the spinal cord at the point of origin of the intercostal nerves which are connected with the irritated branches. In this experiment the contraction of the vessels is greatest in the half of the cord from which the communicating branches have their origin.

Anæmia of the spinal cord of a rabbit has been produced by ligating the aorta. In this experiment complete paralysis of all the muscles occurred which were supplied by nerves having their origin from the anæmic part of the cord. The results of these experiments, with the accompanying symptoms, make the diagnosis clear in this case. Irri-

tation of the chain of sympathetic ganglia caused anæmia of the spinal cord by a reflex action. The paralysis is the result of the anæmia of the cord. With proper treatment the paralysis will disappear, but the sympathetic centres have received so severe a shock that for a long time they will be easily excited, and the danger that the patient may become a hopeless invalid should receive due consideration. Even now some of these centres may have taken on a sclerosed degeneration, and if such is the case, entire recovery is not at all probable. One point to be especially watched is the condition of the right lung. The injury that it has received and the shock to its centres render it liable to a diseased condition that would be difficult to cure.

The treatment should consist of counter-irritation over the spinal column. Hypodermic injections of strychnine, the twenty-fourth of a grain three times a day, should be given to increase the activity of the cerebro-spinal centres, while the bromides, chloral, and cannabis indica should be given to quiet the irritation of the sympathetic centres. The faradic current should be used on the muscles of the paralyzed limb for fifteen minutes in the morning, and passive motion of the limb should be made for the same length of time in the evening. Tonics and stimulants should be used as the symptoms of the case may indicate. The patient should be kept quiet and free from excitement.

At the time that this lecture was delivered the patient had been unable to leave her bed for three months. Three weeks after the above treatment was commenced she was able, by the aid of crutches, to move about the ward, with all of the symptoms very much improved.

DIPHThERITIC PARALYSIS.

CLINICAL LECTURE DELIVERED TO THE POST-GRADUATE CLASS, CHARING-CROSS HOSPITAL.

BY F. W. MOTT, M.D., F.R.C.P.,

Assistant Physician to the Hospital; Pathologist to the London County Asylums.

GENTLEMEN,—There have lately come under my care several cases of diphtheritic paralysis, and by the kindness of Drs. Green and Abercrombie I am able to refer you to two other cases. I wish particularly to emphasize the importance of the diagnosis of mild cases of diphtheria, which are often considered to be simple sore throat. Several of the patients exemplify this in a striking manner, and show the importance in doubtful cases of ascertaining by microscopical examination and by cultures whether the bacillus (Loeffler's) characteristic of diphtheria is present. It is also of importance to examine the urine in doubtful cases, albuminuria being in favor of the diagnosis of this disease. Should such examination determine a diagnosis of diphtheria, however mild the symptoms, a guarded prognosis must be given; for the symptoms are frequently so mild that patients are allowed to resume their occupation when they ought to be resting and recuperating. Many of the severe cases of diphtheritic paralysis, I feel sure, arise from neglect of the above precautions for accurate diagnosis and subsequent treatment. These facts are strikingly indicated in the following cases: The servant-girl (Case III.) who suffered with sore throat, and was allowed to return to her hard work and develop generalized diphtheritic paralysis, and who died in the hospital of syncope from fatty degeneration of the heart. Compare this with the potman (Case II.), who, while in the hospital suffering with a bad sore throat, developed diphtheritic paralysis of the soft palate and pharynx only. There was a question as to the diagnosis in this case, the symptoms were so mild, but microscopical examination and cultures showed the presence of the characteristic bacillus. The man was therefore kept in the hospital in bed until he made a good recovery. Had he been sent

back to his occupation, I believe that he would have had generalized diphtheritic paralysis instead of local, and possibly have died. Dr. Abercrombie, who is an authority on this subject, is of the opinion that diphtheritic paralysis coming on in these mild cases is frequently due to the neglect of proper treatment and rest during convalescence.

The Time of Onset of Diphtheritic Paralysis.—It most frequently occurs between one and three weeks after the disappearance of local symptoms and apparent cure, but it may come on earlier than this, or even during the existence of the false membrane, as in Case IV.

The Cause of the Paralysis.—Roux and Yersen were the first to show that the paralysis is due to the action of a chemical poison produced by the multiplication of the specific micro-organisms, and Sydney Martin has isolated a toxine which, when injected into rabbits, produces a segmental neuritis and fatty degeneration of the muscles. The fact that the bacillus has not been found in the blood or tissues, but only in the false membranes, is proof that this poison is absorbed from the fauces and throat, where the membrane forms, and we can thus understand why it is that the first symptoms are *paralysis of the soft palate and of the pharynx*,—i.e., the effect is first local upon the nerve endings of these structures, producing inability to swallow, regurgitation of fluid through the nose and the characteristic nasal speech, with loss or diminution of sensibility of the parts. In some cases the effects are strictly local,—e.g., Cases I. and II.,—but generally the toxins, becoming absorbed and circulating in the blood and lymph, produce generalized effects, of which the most important is *paralysis of the muscle of accommodation*, by which a patient is unable to read, and this may be the first determining effect upon the mind of the patient which brings him to the doctor.

Next, weakness in the legs, which may be either paraplegic or ataxic, but always with absence of the knee-jerks and generally some loss of sensation affecting the soles of the feet especially, and the termination of the limb rather than the root; the upper limbs and the trunk suffer later in the disease, and there is anæsthesia of the palm and apex of the limb especially. Again, there are often tingling sensations of the limbs, and the Romberg symptom is present.

Pains are, however, rare. Other parts of the body may suffer,—for example, the neck muscles; the face muscles, causing diplegia; the muscles of the larynx and lips, giving rise to a form of glosso-labio-laryngeal paralysis. Various ocular paralyses, such as ptosis, strabismus, diplopia, as in Case V., obtain. There are no mental symptoms to refer to, as the intelligence remains unimpaired.

Paralysis is more liable to occur in adults than in children, but no age is exempt, and there are no reliable symptoms which indicate its advent during convalescence. Albuminuria frequently occurs, however, just at the time of the first symptoms, as in cases cited.

The *prognosis* should be guarded, as it is more often fatal than is usually thought. The mortality on an average is given at about twelve per cent. Death may result suddenly, as in Case IV., from cardiac syncope, or by asphyxia from the entrance of food through an insensitive paralyzed glottis, or from paralysis of the muscles of respiration, particularly of the diaphragm, or by intercurrent pneumonia.

On the other hand, most cases get well, particularly when there are only local symptoms. When the paralysis is generalized, it is seldom that the patient recovers under three months, as in Case III., and it may take eight months. The muscles seldom show any signs of degeneration when tested by the faradic and galvanic currents, but occasionally symptoms arise showing that the anterior horn cells have been damaged, and the disease takes on the form of infantile paralysis, with its resulting atrophies and deformities. Such cases may also prove fatal from affection of the respiratory muscles, an example of which I saw some years ago, and of which I show you a specimen of the spinal cord. Occasionally the nerves of special sense are affected, and Dr. Tooth has described an interesting case of deafness arising in diphtheritic paralysis.

I have been astonished at *the long time which the knee-jerks may remain absent*. I have a little patient under treatment whose knee-jerks are still absent, eighteen months after recovery.

Treatment.—This is very simple. Don't do too much; nature imposes rest by the weakness, and the patient should be kept in bed at first. When the symptoms have become generalized, gentle massage of the limbs may be practised, and the patient's muscles thus nourished without any effort on the part of the paralyzed nerves. As soon as the patient feels well enough, he may be taken out in a chair, but he should not be allowed to walk until there is return of sensibility in the limbs and he does not feel tired on exertion. It has always appeared to me that the danger of diphtheritic paralysis is in the failure of the heart or respiratory muscles, especially of the former, as in Case III.; for nature cannot impose rest upon that organ, and, owing to the action of the toxin, the necessary repair of waste does not take place. There is therefore fatty degeneration.

Dr. Abercrombie has found atropine of great use in these cases; it did not serve its purpose, however, in Case III. Strychnia and other

nerve-tonics may be given, but careful nursing is necessary, and proper precautions in feeding, so that fluids do not enter the respiratory passage. Nutrient enemata should be resorted to when there is great difficulty in swallowing. Faradism of the muscles I do not approve of; better results can be obtained by massage.

The cases upon which I have spoken fall into two classes,—(1) those presenting local symptoms of paralysis, and (2) those which have commenced with local symptoms of paralysis, but have been followed by generalized symptoms.

CASE I.—J. B., aged eleven, came to me at the beginning of May. The following history was given: On April 21 he came home from school, and was very sick and feverish. He was attended by a doctor for sore throat, from which he soon recovered. On May 4 his mother noticed that his speech was nasal; he had difficulty in swallowing, and fluids regurgitated through the nose. I found that vision was unaffected, and that, beyond slight weakness in the legs, there were no general symptoms of paralysis. The knee-jerks were present, but the left one was obtained with difficulty. There was no sensory disturbance to be detected. There was a trace of albumen in the urine. As the mother yielded to his wishes not to come into the hospital, I advised her to keep him at home in bed, prescribing a cod-liver-oil emulsion,¹ and advising her to massage the limbs, at first gently, and gradually increasing the time from ten minutes to half an hour, but much fatigue from the operation to be most carefully avoided. He is now quite well, five weeks after the onset of the paralysis, the only noticeable defect being a slight nasal quality of speech.

CASE II.—E. B., aged thirty-five, potman, was admitted under Dr. Green for pharyngeal diphtheria. That it was diphtheria was settled by Dr. Arkle, who made culture and stained preparations of the bacilli. There was very little fever after the first few days, but traces of albumen were present in the urine. *Paralysis of the soft palate and pharynx came on eight days after the disappearance of the false membrane.* The patient was kept in bed for twelve days; no further symptoms of paralysis developed, and he was discharged cured. Save a slight nasal twang in his speech, there was no defect in the movements of the soft palate.

CASE III.—M. L., aged fifteen, domestic servant, was admitted under Dr. Abercrombie² for paralysis of the lower limbs. She was

¹ Equal parts ol. morrhuae, maltine, and syr. ferri phosph. com.

² A full account of this case I shall publish in conjunction with Dr. Abercrombie.

taken with diphtheria November 25; returned to work on December 18. On December 23 the doctor was called in and peculiar speech noticed; patient apparently not confined to bed; symptoms became generalized. Was admitted to hospital January 15, and on January 17 died of cardiac failure. Early and extensive fatty degeneration of the heart was found, but no changes in the vagus nor in any of the nerves of the body.

CASE IV.—Nurse B., under the care of Dr. Willcocks, was affected with sore throat and high temperature. The nature of the complaint was doubtful. The membrane was not examined bacteriologically. There was albuminuria, and, while the throat symptoms were still severe, paralysis of the pharynx and soft palate came on, and the symptoms soon became generalized. I was asked a few days ago to see the case with Dr. Willcocks, concerning the advisability of faradism for the muscles of the limbs. I expressed the opinion that massage would do more good, because it would promote the nutrition of the muscles without irritating the paralyzed nerves.

The legs are now much better, but there is considerable numbness and loss of sensation in the hands, and I expect it will be quite three months yet before she is perfectly strong and completely restored to health. I have now advised carriage exercise daily, and she has been taking arsenic in small doses, also Easton's syrup.

CASE V.—The case before us, gentlemen, is one that was sent to me by Dr. Travis, and as this affords a typical example of generalized diphtheritic paralysis, I shall refer to it at some length.

W. J. B., aged eighteen, an engraver, gives the following account of his illness. He suffered seven weeks ago with sore throat. He remained in bed and sent for a doctor, who told him that he had "influenza."

He was in bed for three weeks; he then got up and went to his work, but soon noticed that whatever he drank came through his nose, and that he could not see properly. He went away for a fortnight, at the end of which time he began to lose his voice. He then noticed weakness of his legs, for which symptom he was sent to me. We will examine his present condition. He is pale, and says he has never felt well since his illness. The temperature is normal and the pulse 88, regular, but soft and compressible. You will notice that in answering questions his speech is very nasal and that he speaks in a low tone, but he can alter the pitch of his voice; his crico-thyroid muscle is therefore not paralyzed. You will observe that the patient can now swallow without the fluid regurgitating through the nose when he takes small

sips, but he swallows with obvious effort. There is no loss of expression, and therefore no facial paralysis. On examination of the throat no membrane is seen; the uvula deviates slightly to the left, and there are no spontaneous movements of the palate. The pillars of the fauces, the pharynx, and the soft palate, you see, can be touched without provoking any reflex. You will notice occasionally a slight squint in following an object moved to the left; this is due to slight weakness of the left external rectus, and probably accounts for the diplopia he has occasionally had. The muscle of accommodation is affected still, for he is unable to read, but the light reflex is present, though sluggish. You notice how he sits with his chin falling on his breast and his back arched, owing to the weakness of the muscles of the neck and back.

He walks with difficulty, and there is an obvious want of co-ordination of movement as well as actual loss of power. He complains, moreover, of numbness in the soles of his feet, and doubtless we shall find that he has loss of tactile sensibility at the extremities of both lower limbs. The accompanying diagrams (Fig. 1) show this loss of sensibility, tested more carefully afterwards by Dr. Senior.

DR. SENIOR'S NOTES ON SENSIBILITY.

Sensation.—Tactile sensibility is good all over the trunk and upper extremities, with the exception of the dorsum of the hands, fingers, and buttock, which do not seem to readily appreciate light touches. When light pressure is felt, localization is very correct, although patient seems to have some difficulty in recognizing the position of his limb. In the parts shaded in the diagram there is a very marked blunting of tactile sensation in the lower extremities.

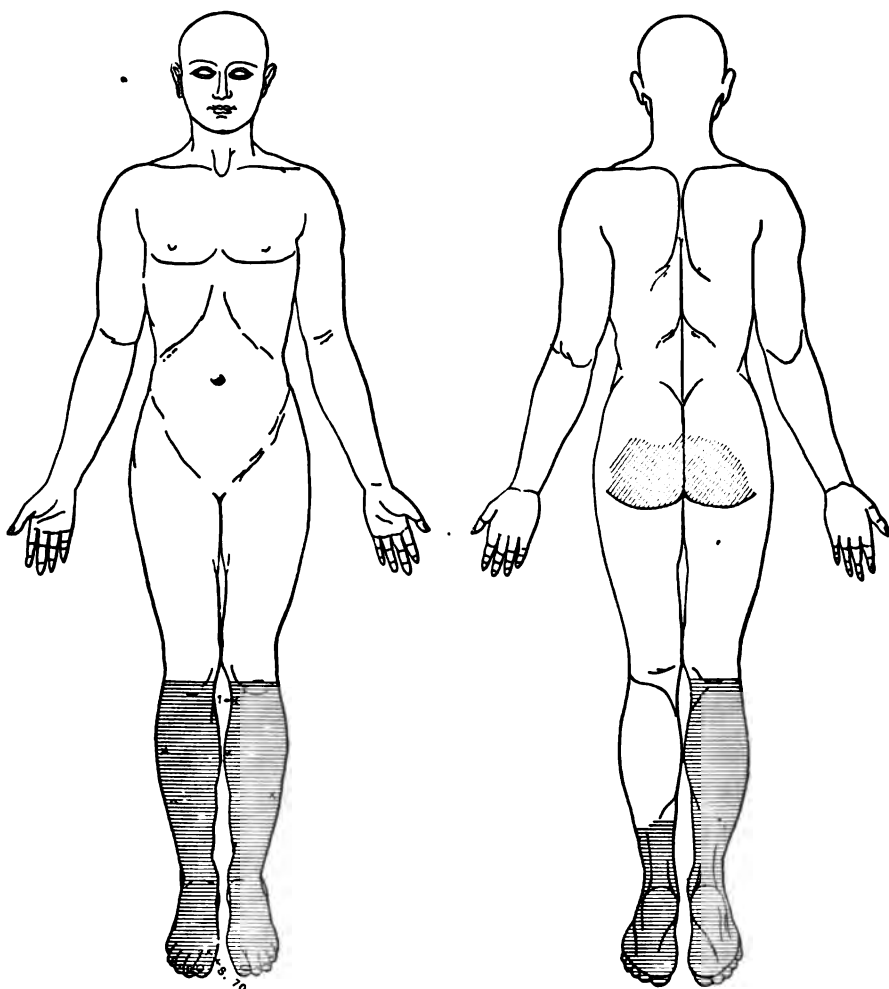
A cold tube, when brought into contact with the patient, is readily recognized everywhere. Light touch of a cold tube is always felt, whereas, especially about the legs, a light touch with the finger is not always felt.

With a hot tube the patient occasionally makes mistakes over the areas of blunted tactile sensibility. A hot tube is not always recognized as such, and is sometimes said to be cold. When the tube is sufficiently hot to give patient pain, there is delay in transmission on most parts of the legs below the knees; above the knees there is no appreciable delay.

With painful sensations not caused by heat there appears to be no delay.

The knee-jerk is absent on both sides, and the muscles are wanting in tone, but all the muscles respond normally to faradism and galvanism.

FIG. 1.



Tactile sensibility blunted over shaded areas.

The upper limb seems much less affected than the lower limb at present. Probably, like Nurse B., this portion of the body will become more affected as the lower limbs get better.¹ The grip is fairly good, and there is only a trifling loss of sensibility. It is quite pos-

¹ This actually occurred afterwards, as was expected. For a fortnight later, the notes state, he has "a feeling as if he had gloves on his hands."

sible to believe that the loss of motility is due as much to the paralyzing effect of the toxine upon the afferent nerve-fibres as the efferent. This seems probable from the fact that the paralyzed muscles show no electrical changes ; moreover, in these cases, as sensation improves, so does movement. I look upon the loss of muscular tonus to be due as much to the interference with the passage of afferent sensations to the spinal centres as to functional or organic changes in the anterior horn cell and its prolongation and final expansion in the muscular fibres.

The urine, I am told, contains a large trace of albumen, a sure indication that toxins are still in the blood.

In conclusion, I wish to impress upon you the desirability of examining doubtful cases of sore throat most carefully. To tell a patient that he is suffering with diphtheria when he is not often means very great expense, alarm, and inconvenience to the patient and friends, but that is more pardonable than the converse statement. Never neglect, therefore, in a doubtful case to have a *culture and microscopic specimen* of the suspicious membrane made, especially if there has been *even a trace of albumen in the urine*. If diphtheria is thereby diagnosed, do not let your patient return to his work until three weeks or a month after convalescence, and *examine the urine periodically* ; should albumen (even a trace) appear, put the patient back to bed ; and more especially should rest in bed be enforced if signs of local paralysis manifest themselves. Finally, remember the danger of a fatal termination comes most frequently from heart-failure ; therefore all excitement and unnecessary action of the heart must be avoided.

Surgery.

THE TREATMENT, COMPLICATIONS, AND DIFFERENTIAL DIAGNOSIS OF ACUTE SEPTIC OSTITIS IN CHILDREN AND YOUNG PEOPLE.

CLINICAL LECTURE DELIVERED AT ST. MARY'S HOSPITAL.

BY EDMUND OWEN, M.B., F.R.C.S.,

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LECTURE II.

GENTLEMEN,—In the matter of the treatment of acute septic ostitis in children there are two elements of prime and of equal importance. They are promptitude and thoroughness.

In dealing with a simple acute abscess in the ordinary way the surgeon is apt to say to himself, "As I am not quite sure as to the presence of suppuration I will wait a while;" and so he delays speculative interference,—it may be for some hours, it may be for a day or two. I do not defend such Fabian tactics; far otherwise. But I know that there are some surgeons who would deem their art actually discredited if they cut into inflammatory tissue in search of pus and failed to discover any. It may be that in the ordinary run of unimportant surgical inflammations no great harm is entailed by such delay. But in the case of acute inflammation of a diaphysis such cautious tactics are deplorable. During the time that is lost the staphylococci are developing at a terrible rate; they are diffusing themselves along the bone tissue and marrow, causing septic thrombosis through the entire diaphysis, perhaps. These unchecked and devastating germs are determining a purulent exudation beneath the periosteum, and not only are they involving the diaphysis in an inevitable necrosis, but they are subjecting the unhappy patient to needless agony and to the terrible and hourly increasing risks of fatal pyæmia.

Immediately on seeing a patient with diaphysitis the limb should be thoroughly cleansed, for the presence of foulness within must not be taken as rendering external asepsis superfluous. The patient being

under an anæsthetic, a free incision should be made through the periosteum of the affected area and down upon the bone. This proceeding either does, or it does not, evacuate a subperiosteal abscess. Assuming that it does reveal the presence of suppuration, the surgeon should freely open up the cavity and as quickly as possible wash it out with a hot solution of mercuric perchloride,—one in two thousand. Then he should see what extent of the diaphysis is bare ; and he may be quite sure of this, that the length of bone denuded is not equal in extent to that of the bone in which the vessels are in a condition of septic thrombosis.

If the chief part of the diaphysis is bare both in length and circumference, the probability is that that piece will necrose bodily. But by good fortune it may not do so, especially if the tension has been quickly relieved. I have met with an instance in which I could pass a probe completely round the bare tibial diaphysis of a boy in a considerable extent of its length ; yet, after thorough irrigation and drainage, the periosteum in due course became again adherent, and no necrosis supervened.

If on opening the abscess the diaphysis be found denuded of periosteum, and one of its ends be detached by suppuration from the epiphysis, there can, I think, be little chance of its surviving. It is better, then, to resect the denuded part of the bone forthwith, and to hope for the regeneration of a diaphysis from the periosteum. And such an occurrence is by no means unlikely to happen.

If both ends of the denuded diaphysis be detached, there can be no doubt as to the advisability of lifting it bodily from the subperiosteal bed of pus in which it is lying. Possibly amputation may, however, be deemed the better alternative in certain instances.

I freely admit that the treatment here advised may in some cases be followed by failure ; that the periosteum does not resume its osteogenetic function ; that the limb remains useless, and that amputation has eventually to be resorted to after much disappointment and delay. But when this treatment succeeds it is extremely successful ; and when it proves disappointing it is pretty certain that less radical measures would not have achieved a better result. Indeed, I have witnessed the occurrence of necrosis in so many of these cases that I am convinced that we err upon the side of doing too little rather than doing too much in the treatment of osteomyelitis.

The great advantage of the treatment by resection is that it effects the prompt removal of the medium in which the cultivation of the cocci is taking place. And if it is efficiently done, and if the surround-

ing tissues are thoroughly washed by a germicidal lotion, there is practically an end to the disease. Of course, there is a risk of the ablation being carried out with superfluous energy; that some bone tissue is removed which is not infected with germs. But, after all, this does not amount to much; "yet better the excess than the defect."

The same objection has been raised against the treatment of carbuncle by resection and scraping. But no one, I think, who has watched the progress of cases of carbuncle which have been dealt with after this manner can have two opinions as to its value.

I do not wish to insist that in every case of septic diaphysitis with a loosened epiphysis the resection treatment can be carried out; but in most cases it can. Probably if the lower end of the femoral diaphysis were bare and detached, amputation might in many instances be preferable. The value of the femur for the purposes of support and progression would be so seriously interfered with by the operation of partial resection that there is much to be said in favor of amputation.

In those cases in which the diaphysis is bare and its continuity with the epiphysis persists, resection is scarcely to be adopted, for, as we have seen, necrosis is not inevitable, though it is probable. In such circumstances it is advisable to lay the shell of compact tissue freely open, and to scrape out the septic marrow and the cancellated tissue. After this, the hollowed bone is to be washed out with hot mercuric solution, one in three thousand, and gently dressed with mercuric gauze, the limb being carefully fixed in a splint and raised on a pillow. By these measures the intra-osseous tension is effectually eased, and the septic foci are cleared away, with the twofold advantage of diminishing to the utmost the risk of extensive necrosis and of pyæmia. Without question there are a large proportion of cases of septic osteitis for which on their admission into the hospital no treatment short of amputation can be recommended.

The indications for amputation cannot be concisely and definitely formulated; each case must be considered by itself. Exhaustion, high temperature, rigors, and delirium do not by themselves establish the expediency of amputation; grave as these symptoms are, they are usually associated in every severe case. Nor, among the local signs, are great swelling of and tenderness in the part, extensive subperiosteal abscess, and detachment of an epiphysis to be taken as affording that indication, for they coexist in many a case in which a useful limb is eventually preserved. Nor does the conjunction of these two groups of general and local signs necessarily demand amputation.

In the case of the disease extending into and causing acute suppu-

ration of the neighboring joint, it is generally expedient to amputate. But even in these circumstances resection may sometimes be successfully resorted to. I reported two such cases before the Medical Society of London some years ago.

In the later stages, when the disease has been allowed to drift on until the end of a bare diaphysis is making its way through a mass of granulation tissue, and the boy is worn out by long-continued suppuration, it is better to remove the limb forthwith. In such a case the periosteum is likely to be wholly replaced by granulation tissue, so that even if a large sequestrum were lifted out there would be little likelihood of a new diaphysis being formed. Thus, temporizing would lead to disappointment, and an inevitable amputation would be unfortunately postponed. For the regeneration of a diaphysis, or of part of one, early resection of the infected bone is necessary.

When two or more bones are affected it may be expedient to amputate that which was the seat of the original disease, and to temporize, may be, with the other. But amputation of a single limb by no means suffices for the successful issue of all these serious and pyæmic cases.

The fact of a boy having well-marked pyæmia is not of itself an indication that the primary seat of septic disease should be removed by amputation, though, doubtless, in many cases amputation offers the safest course. As I said just now, each case must be taken on its merits. Pyæmia and metastatic abscesses appearing shortly after the primary manifestation are much more likely to demand amputation than are similar conditions appearing later in the progress of the case.

I have at the present time under my care at St. Mary's Hospital (February, 1895) a boy of thirteen years, whose illness began a little more than a year ago with acute para-epiphysitis in the lower end of the left femur. We cut into the bone through the interval between the ilio-tibial band and the tendon of the biceps, removing a central sequestrum from the end of the diaphysis, and clearing away much septic granulation tissue. Within a few weeks the boy had severe constitutional disturbance, and acute diaphysitis manifested itself at the upper end of his right humerus. This was also dealt with by scalpel and gouge, and everything went on well, though the femoral wound did not heal. Some months afterwards he again came into the hospital and more sequestra were removed from the thigh. The wounds had entirely healed when he had a further disturbance, acute synovitis appearing in the opposite knee, and intra-articular suppuration ensuing. This pyæmic abscess was treated by free incision and mercuric irrigations, and he is now convalescent. It is, I trust, the last of his troubles.

Indeed, I should think that the boy's blood has been so fully leavened with the toxins elaborated by the cultivation of the micrococci that he is now proof against further infection. Very different is this form of pyæmia from that which sometimes appears in the early weeks of septic osteomyelitis. In the latter case the dose of toxin cast into the blood-stream not only paralyzes the nerve-centres, but it may be so potent that the patient, unable to eliminate it, sinks beneath its fatal influence.

Complications.—The commonest and the most serious complication of acute septic osteitis is, without doubt, pyæmia. Indeed, I would not dispute the contention that these cases are essentially and from the beginning pyæmic; certainly the constitutional symptoms are those of pyæmia, and it is only a question as to the entrance of the staphylococci into the blood-stream, and the establishment of secondary foci of suppuration, as to whether or no the general signs of infective blood-poisoning shall be manifested. In some cases the septic intoxication is so acute that the subjects perish almost at the onset; at any rate they do not live long enough to give manifestations of the infective form of the disease. In other cases the children struggle bravely through the acute stage of pyæmia to fall victims to a lingering form of that disease, or to exhaustion, hectic fever, or albuminoid disease of blood-vessels and of the viscera.

One of the most likely complications of the para-epiphysitis is extension of the disease into the neighboring articulation. In the case of the primary disease attacking the upper end of the femoral diaphysis, implication of the hip-joint is almost inevitable, for the simple reason that the end of the diaphysis is included within the capsule. But in the case of a diaphysis being inflamed near a shoulder, knee, or ankle, the pus would have to burrow into the joint. This it may accomplish in one of two ways,—either by transversing the junction cartilage and epiphysis, or by creeping thither beneath the periosteum of the epiphysis. Of both examples I have met with various instances. At one time I had under my care in the same ward two children into whose knee-joints the pus had made its way direct from the seat of septic infection. In one case the pus had effected its entrance by working its way through the head of the tibia, and in the other by passing beneath the periosteum and the capsule. In each case the invasion was signalled by an attack of acute arthritis, but a resort to immediate resection of the joint and a radical dealing with the septic bone was the means of saving each limb.

Differential Diagnosis.—The two diseases with which septic diaphy-

sitis is most often confounded are acute rheumatism and erysipelas. Of the two errors the former is by far the more common. I have known accomplished and experienced physicians to fall into this error, and if I may be allowed to sketch a clinical outline of a case likely to mislead, it will be seen that almost any practitioner might go wrong over it. For instance: A boy of ten years is playing about in the beginning of a thaw, sliding and snow-balling. He comes in with his boots and trousers wet through. There is nothing remarkable in this; but it so happens that within a week of that occurrence, probably because of it, staphylococci begin to cultivate themselves in the lower end of his femoral diaphysis. He complains of pains about his knee, which his mother attributes to "rheumatism." (Most mothers consider themselves able to treat as well as diagnose "rheumatism.") She puts the boy to bed and foment the knee. He gets steadily worse. In two days she sends for the doctor because, as she says, her boy has "rheumatic fever." The boy is evidently feverish. The doctor takes his temperature; it is 103° to 105° F. The skin about the knee is flushed and burning hot; there is swelling near the joint, and there is so much tenderness close above it that the boy will scarcely let the doctor examine it, and he begs for the fomentation to be reapplied at once. Next day the boy is worse; he has not slept an hour; his temperature is a degree higher; he had a rigor during the night, and was "wandering;" moreover, he has now acute septic inflammation at the other shoulder, and, perhaps, some pyæmic pericarditis. My opinion is that almost the only man who would not be misled by such symptoms is he who realizes the fact that septic diaphysitis is a very serious, acute, and common disease with children. And he, by gently pinching the femur between his finger and thumb, would find that the disease was in the *bone*, and not in, though very close to, the joint. And if then, under an anæsthetic, he could not detect pus, he would immediately expose the bone through the groove between the ilio-tibial band and the biceps tendon, and explore or trephine for abscess.

Septic diaphysitis is not very often taken for erysipelas. Yet this error is now and then committed. Each is an infective blood-disease, and when the diaphysis concerned is superficial, as in the tibia, for instance, the extreme local swelling and the marked redness of the skin may, with the background of general symptoms, lead to error. But here again a gentle pressure of the diaphysis between the finger and the thumb would show that the swelling and tenderness were evidently in the bone and periosteum, and not in the bright red skin.

A CASE OF CHOLECYSTOTOMY.

CLINICAL LECTURE DELIVERED AT ST. GEORGE'S HOSPITAL.

BY T. PICKERING PICK, M.D., F.R.C.S.,

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GENTLEMEN,—I propose to draw your attention to the case of a patient upon whom I recently operated for “dropsy of the gall-bladder,” as I think that there are certain points in the diagnosis and treatment of the case which it will be of advantage to discuss. The case is briefly as follows :

Edith W., aged twenty-seven, married, was admitted on February 27, with the following history. The patient has had two children, the youngest two years ago. Both labors were difficult, requiring instrumental assistance for delivery. She has always been fairly strong, and has suffered from no serious illness. Shortly after her last confinement she had an attack of pain “all over her abdomen” accompanied by sickness. This soon passed off. Seven weeks ago she was suddenly attacked with violent pain in the right hypochondriac region, extending up the right side of her chest to the right shoulder. This lasted for twenty-four hours and was accompanied by vomiting. At first she was cold and chilly but had no distinct rigor, then she sweated profusely. After the attack had passed off she noticed a lump in her right side, and this has increased ever since and has become very painful, so that she is unable to bear the pressure of her clothes. There was no jaundice during or after the attack. The bowels have been constipated since, but the motions are reported to be natural in color.

Upon examination she was found to be an anæmic-looking woman. There was no jaundice or tingeing of the conjunctivæ. In the right hypochondriac region, immediately below the ninth costal cartilage, was a tumor about the size and shape of a kidney. The lower margin of it could be distinctly defined and reached as low as the level of the umbilicus ; the upper margin could not be defined, but appeared to extend upward under the costal margin. The lateral borders could be

clearly defined below but not above. The tumor was vertical in its long axis. Upon making the patient take a deep inspiration the tumor could be distinctly seen descending under the abdominal parietes to the extent of about one and a half inches. It was tense, smooth, and uniform in outline, and no fluctuation could be detected in it. It was dull on percussion and the dulness was continuous with the hepatic dulness. When handled it gave rise to pain, but the pain complained of was not of a sickening character. Percussion in the loin gave a dull note, and there was no sense of deficient resistance in the ilio-costal space. It could not be moved from its position except when pressure was made from below, it then appeared to turn up on its own axis over the ribs. By bimanual examination the right kidney could not be felt in its normal position.

On March 21. the patient having been anaesthetized, I made an incision three and a half inches in length, in the right semilunar line, from the costal margin downward. Upon opening the peritoneal cavity the tumor at once presented and was evidently an extremely thin-walled cyst. It was punctured and about six ounces of perfectly clear, limpid fluid withdrawn. The sac was now laid open, and upon introducing the fingers numerous gall-stones were felt. These were removed and were found to be fifteen in number. They were all more or less faceted. One of them was tightly wedged in the neck of the gall-bladder and by a pointed extremity in the commencement of the cystic duct, and it was only with considerable difficulty that I was enabled by means of my finger-nail and a director to dislodge it. The cystic duct could be felt throughout its whole length to be much thickened. It was the size of a goose-quill and quite hard and rigid, but the thickening did not extend into the common bile-duct. The thickening was uniform and appeared to be due to inflammatory infiltration. No gall-stones could be felt in the duct. The margins of the incision in the gall-bladder were stitched to the external wound and the rest of the wound closed.

The patient made an uninterrupted recovery. The opening into the gall-bladder closed in about a month, and during the time it remained open there was never the slightest trace of bile on the dressings.

In discussing this case, I desire in the first instance to say a word or two on the diagnosis, for, as you will have gathered from what I have said, the exact nature of the case was not quite clear; at all events, there were some points of ambiguity about it, which rendered it somewhat uncertain what we should find when we proceeded to

operate. Though there were some features which pointed strongly to its being a case of dilated gall-bladder, there were others which pointed away from this opinion.

You will note in the first instance that we had a definite point to start from, and that was the presence of a tumor in the abdominal cavity, and the point we had to solve was what was the nature of this tumor. Its position at once suggested that it was connected with the gall-bladder. It was situated just below the ninth costal cartilage in the angle formed by the right semilunar line with the costal margin, and this is, as no doubt you are aware, the position of the gall-bladder. But there are many other things which may produce a tumor in this situation. Among the most common of these I may mention a moveable kidney, an hydatid cyst connected with the free border of the liver, a soft cancerous nodule of the liver, abscess of the liver, tumor of the omentum or pancreas, or even an ovarian cyst. We had therefore to consider whether it might be any of these, and by a careful analysis of the symptoms endeavor to arrive at a correct diagnosis.

Let us examine these various conditions a little more in detail. It not unfrequently happens that a movable kidney presents itself in this situation,—that is to say, just below the costal margin, so that the lower part of the organ can be well defined, whilst the upper part projects under the margin of the ribs and is thus out of reach of the fingers of the surgeon, and under these circumstances would exactly resemble what was observed in this case, for it must be confessed, the portion of the tumor which was capable of being freely manipulated resembled very closely in size and shape the lower extremity of the kidney. It presented the same obtuse rounded extremity and somewhat flattened anterior surface, with well-defined rounded borders, that the normal kidney does. Then, secondly, there was the movement of the 'tumor with respiration; this was most perceptible and undoubted, and seemed to show that the tumor was connected with the liver, but unfortunately experience proves that the displaced kidney is also influenced by the respiratory movements, and that during a forced inspiration it can be felt to descend. In connection with the alterations in the position of the tumor, one point was in favor of its being connected with the liver, and that was that it did not move with alterations in the position of the body, as is often the case with a movable kidney, which sinks lower in the abdomen when the patient assumes the erect position. On the other hand, there was another fact which seemed to point to the tumor not being a dilated gall-bladder, and that was the direction of the long axis of the tumor. This was distinctly vertical. Now,

in cases of enlargement of the gall-bladder the direction of the long axis of the tumor is usually oblique,—that is to say, in a line drawn from the tip of the tenth cartilage on the right side through the umbilicus to the opposite side of the body.

The evidence which we obtained by a physical examination by percussion was all in favor of an enlarged gall-bladder and against a movable kidney. In the first place percussion over the tumor was distinctly dull, whereas percussion over a movable kidney usually yields a more or less tympanitic note, due to the presence over it of the colon, or possibly some coil of small intestine. Then again there was the absence of any zone of resonance between the dulness of the tumor and that of the liver. Now this may not be so in the case of a movable kidney, where oftentimes a coil of intestine insinuates itself between the lower margin of the liver and the displaced kidney. And then finally there was the negative evidence of percussion in the loin. In a case of movable kidney percussion over the vacated loin usually gives a more or less distinctly resonant note. This was not so in the case under discussion: in both loins there was uniform dulness and the dulness was the same on both sides of the body. Next we obtained certain evidence by palpation, and this was also in favor of a dilated gall-bladder. First there was no evidence of deficient resistance in the ilio-costal space. In cases of movable kidney where this organ has left the loin, there is often to be felt a diminished resistance on the affected side as compared with the other, and, indeed, in some cases a distinct flattening and hollowing out may be perceived on inspection. This was entirely absent in our case and led to the assumption that the kidney was present in its natural situation. But against this it must be noted that the right kidney could not be felt, even when the patient was under the influence of an anæsthetic, by a bimanual examination, though the left one was distinctly felt. Then again the pain produced by examination was not of that peculiar sickening character which is often complained of when the kidney is manipulated. Finally, we had to consider the history of the patient, and here the balance of evidence seemed to be pretty equally divided. On the one hand we had the history that the swelling appeared after confinement, and that the labor was a severe and instrumental one. Now, there is no question that pregnancy has a good deal to do with a movable kidney, the majority of cases occurring in women who have borne children, no doubt very frequently being due to their getting about too soon after delivery. On the other hand, we had a history of an attack which in some of its features seemed to resemble an attack

of hepatic colic, and which if it had been followed by jaundice would undoubtedly have been regarded as such.

I have now passed briefly in review the various symptoms which our patient presented, especially as regards the differential diagnosis between an enlarged gall-bladder and a movable kidney, with which it is most likely to be mistaken, and it seems that the balance of evidence was in favor of its being the former condition, or—shall I rather say?—in favor of its being a tumor connected with the liver and not of renal origin.

I have now to say a word or two about the differential diagnosis from other tumors of the liver, for there was nothing about it that suggested to our minds even for a moment that it was a tumor of the omentum or pancreas or an ovarian tumor. But it might have been an abscess in the liver, or a soft cancerous nodule of the liver, or an hydatid cyst connected with this organ.

Was it an abscess? The fact that abscess of the liver is very rare in those who have lived always in our temperate climate pointed away from this. Then there was the absence of any rise of temperature, and the general aspect of the patient did not indicate the formation of pus. In cases of abscess of the liver there is generally a worn and anxious expression of countenance and a general deterioration of the health is early manifested. But our patient lay in bed with a perfectly serene and placid appearance, and, when the tumor was not being manipulated, apparently without any appearance of suffering. We felt able, therefore, to discard the opinion that she was suffering from abscess of the liver. Was it a cancerous nodule or even cancer of the gall-bladder? Here again the general aspect of the patient seemed to negative this, as did also the age. Cancer of the liver is very rare in early life, though I am bound to say it has been recorded. Frerichs has tabulated eighty-three cases; of these forty-one, or nearly one-half, occurred between the ages of forty and sixty and the other half in nearly equal proportions above and below that period. Then again of all the cases of malignant disease of the liver, it has been computed that in three-fourths the disease in this organ is secondary to disease elsewhere, but in our own patient there was no evidence of cancer in any other part of the body, so that this rendered it improbable that the tumor was cancerous in its nature. Finally, the smooth, regular outline of the tumor in contradistinction to the irregular and oftentimes nodulated contour of a cancer, and the absence of pain and jaundice and ascites which are common symptoms in malignant disease, enabled us to discard the hypothesis.

And now we come in the last place to a consideration of the question whether this was an hydatid cyst developed in the free margin of the liver and projecting from it into the abdominal cavity. And here I must confess that I was in a little doubt, and when I commenced my operation I was quite prepared to find an hydatid cyst and should have been in no way surprised if this had turned out to be the true nature of the case. Perhaps I was somewhat biased in this direction from my recollection of a case which I saw some years ago, in which, as far as I could remember, the symptoms were very much the same as those in the case under discussion and in which the disease turned out to be an hydatid cyst. But the fixity of the tumor and the fact that the dulness over the tumor was continuous with the hepatic dulness made me finally give the opinion that the case was one of distended gall-bladder due to some blocking of the cystic duct by a biliary calculus. I will ask you to note in passing that if one of the ducts of the liver was obliterated by a gall-stone, it was clear that it must be the cystic duct and not the common bile-duct, for if it had been this latter it is obvious that there would have been obstruction to the escape of the bile into the duodenum, and as a necessary consequence there would have been jaundice and clay-colored stools.

So much, then, for the diagnosis of our case, and, having made up our minds on this point, the question arose as to what treatment should be pursued. It seemed to me that this was a case in which something ought to be attempted for the relief of the patient, principally for the reason that she was incapacitated from any of the active duties of life, owing to the fact that she was unable to bear the pressure of her clothes on the tumor. I am aware, however, that in many of these cases it is taught that there is no necessity for surgical interference. A writer on this subject some ten years ago said, "Dropsy of the gall-bladder is not a dangerous disorder and requires no treatment." When the neck of the gall-bladder becomes obliterated by a gall-stone or by adhesive inflammation, the admission of bile into it at once ceases; what bile chances to be present in it is absorbed and its place is taken by a secretion from the walls of the gall-bladder itself, which may be either of a mucous or serous character. This fluid continues to be poured out for a considerable time, so that the gall-bladder may become, it is said, as large as a foetal head, but eventually the fluid ceases to be secreted and the tumor either remains stationary or else diminishes in size. Pain may then cease and the tumor cause no further uneasiness. But this is not always so; when gall-stones are present ulceration may occur and induce death from perforation.

On these grounds then I determined to operate, especially as the progress in the surgery of affections of the gall-bladder during the past decade has been very great, so that surgeons now operate with confidence in cases in which the pioneers in hepatic surgery would have hesitated to do so.

There are two modes of proceeding which might have been followed in this case, for I must ask you to bear in mind that we were not absolutely sure of our diagnosis, and that therefore any operation was in the first instance of the nature of an exploratory measure. We might, in the first instance, have aspirated the swelling. This would have rendered our diagnosis certain, but could only be done with risk to the patient, for there is always the risk of leakage in tapping a cyst in the abdominal cavity; so that as a means of diagnosis alone, an exploratory incision is far safer for the patient. I determined, therefore, that I would make an exploratory incision into the abdominal cavity and then be guided by what we found as to what should be our next step.

Supposing that the case turned out to be one of distended gall-bladder, there are four courses which we might have pursued.

1. The gall-bladder might have been opened, the stones removed, and the wound in the gall-bladder at once sewn up, the abdominal incision then being closed.

2. The gall-bladder might have been opened, the stones removed, and the edges of the incision in the gall-bladder sutured to the external wound, and thus a fistulous communication between the gall-bladder and the exterior established.

3. The gall-bladder after it had been freed of its contents might have been connected with the intestinal canal, preferably the duodenum, by means of a lateral anastomosis, so that a fistulous communication between the two would be established and the fluid in the gall-bladder would then empty itself directly into the intestinal canal. This is known as cholecystenterostomy.

4. The gall-bladder might have been completely removed.

Perhaps to these I ought to add a fifth mode of procedure, for recently Block¹ has suggested a new method of dealing with these cases. After the abdominal cavity has been opened he draws out the gall-bladder, fixes a portion of it outside the wound by sutures, and waits till adhesions have formed and the peritoneal cavity has closed before he opens the gall-bladder. This is then done, the stones are removed, and

¹ Rev. de Chir., February, 1895.

the wound in the gall-bladder is at once closed by sutures. When union is complete the bladder is separated from the margins of the wound in the abdominal wall and returned into the peritoneal cavity, the external wound being finally closed. I do not think, however, that this plan of proceeding is likely to be largely adopted. It is a complicated process, involving three distinct operations and a very considerable period of time for carrying it out.

You will remember that I adopted the second of these various procedures which I have enumerated, the operation which is known by the name of cholecystotomy, and I propose now to discuss with you the reasons for my choice. No doubt the plan of removal of the stone or stones and immediately suturing the wound in the gall-bladder and closing the external wound is theoretically the most rational and complete operation. I did not adopt this procedure in my case, though I commenced the operation with the intention of doing so, for two reasons. In the first place there seems to be a very strong probability that the cystic duct was occluded in consequence of the very great thickening of its walls by inflammatory exudation, which could be felt when the duct was explored by the finger, and that this had almost certainly taken place is pretty evident from the fact that there was never a trace of bile on the dressings after the operation until the wound closed, showing that none of this fluid had found its way into the gall-bladder. I think if I had sutured the bladder and closed the wound there would have been no permanent relief to the patient. A fresh collection of fluid would have taken place, which would not have been able to find an exit through the cystic duct, and all her old troubles would have recurred. My second reason for not immediately suturing the gall-bladder was the extreme thinness and consequent friability of the coats. Those of you who were present at the operation will remember the difficulty I had in uniting the gall-bladder to the margins of the external wound, on account of my sutures continually tearing their way out, if even a slight amount of traction was put upon them. I therefore feared to attempt to immediately suture the wound in the gall-bladder, for fear my sutures should not hold and that there would be an escape of the contents of the gall-bladder into the peritoneal cavity after the external wound had been closed. I am aware that blocking of the cystic duct is one of the reasons given for performing the operation of total extirpation of the gall-bladder, but I did not entertain any serious thoughts of performing this operation, which, I think, is a very severe one and ought to be reserved for those cases where the walls of the gall-bladder are so much diseased or infiltrated with new growth as

to render its return into the abdominal cavity unjustifiable, if it can be removed. There remained, therefore, for us only two plans which seemed applicable to the case in hand,—namely, cholecystotomy, or stitching the gall-bladder to the external wound, and cholecystenterostomy, or making a lateral anastomosis between the gall-bladder and duodenum. And though I selected the former of these two methods, I sometimes have a feeling of regret that I did not select the latter. My reasons for not doing so were, first and chiefly, on account of the very attenuated and friable condition of the walls of the gall-bladder, so that I feared they would not bear the strain which must be put upon them, whether the junction was made by Lembert's suture or Senn's plates or Murphy's button; and, secondly, I did not select this method because it would have unduly prolonged the operation, which had already occupied a very considerable time, mainly on account of the difficulty which had occurred in extracting the stone which was wedged in the neck of the gall-bladder. I felt quite sure that one of the great causes of want of success which frequently attends these complicated operations on the abdominal viscera is the great length of time that the proceeding necessarily occupies, and during which the patient has to be kept under the influence of an anæsthetic, and the consequent shock which results.

There is no question that the operation of cholecystenterostomy is a most satisfactory one. Dr. Murphy has recently recorded seventeen cases in which he has performed this operation by means of the button which bears his name, and in every instance with complete success. These results leave nothing to be desired, and other authors have recorded cases in which they have operated with Senn's plates or by means of Lembert's sutures with equally satisfactory results. So that the operation must be regarded as a fully established one and is another of the many brilliant achievements in abdominal surgery of the present day.

THE TREATMENT OF HYDATID CYSTS.

CLINICAL LECTURE DELIVERED AT HOSPITAL COCHIN.

BY DUJARDIN-BEAUMETZ, M.D., Paris.

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GENTLEMEN,—The treatment of hydatid cysts has made considerable progress in late years, and it would be well to go over the subject, as we have some patients at present in our wards suffering from this trouble.

Up to the present time the cure of hydatids has been confined to physicians more than to surgeons. The methods used were mainly medicinal, but drugs no longer possess the confidence of any clinician. The system of operating by puncture has been vastly improved by using Dieulafoy's and Potain's instruments, which permit of the aspiration of the liquid, and in single cysts which contained but few secondary sacs we have often seen cures made with these instruments. Lancereaux, Gérin-Rozé, and Laveran have written at length on this subject. It must be recognized that cures by simple aspiration are the exception, for in many instances the great number of the hydatids have impeded the suction and prevented the efflux of the liquid. In such cases we had to apply the Récamier method of using caustics, or else we penetrated directly to the sac by means of a large-sized trocar without any previous application of caustics. We left the trocar in for a certain time in order to excite the formation of adhesions between the tumor and the abdominal walls. This was Dr. Jobert de Lamballe's method, and with it we have frequently secured good results. In any case, by penetrating slowly to the cyst by the application of caustics or by making punctures directly into the sac, we made some cures, but we did not always prevent the symptoms of septicæmia coming on, from the difficulty that the liquid had in flowing from the opening made, this notwithstanding the frequent antiseptic lotions that we applied, so that many of these patients succumbed to the effects of prolonged suppuration.

It was first proposed, in order to obviate this trouble, that we should apply electro-puncture or electrolysis to kill the hydatids. This method was used by Hilton-Fagge and Semmola, and we tried it also, but without satisfactory results. If you consult the cases that were published you will see that in many instances suppuration resulted after the application. This led to the antiseptic methods used first by Volkmann, based on the ideas of Bégin, who opened the sac in two operations, first making an incision as far as the peritoneum, and several days afterwards opening the sac itself. Simon, of Heidelberg, then proposed to introduce into the sac two fine trocars a few inches apart, which were left in place for some days, when the sac was incised between them.

We now come to the method that appears to us to unite all the required elements for success. That is Lindemann-Landau's, which has been adopted by Lawson Tait since 1880, and which is used at the present day by most of our surgeons.

We must not forget that, while the surgeons were busily occupied in searching for some improved method for the treatment of hydatids, physicians as early as 1884 were attempting a new treatment by the injection of antiseptic fluids. Mégnard was the first who operated upon a patient, that was suffering from hydatid cyst of the liver, by aspirating, and then washing out the cavity with a pint of corrosive sublimate solution, and he drew off the liquid and proceeded to a second washing with one hundred grammes more of this solution, and then finished by a last cleaning out with an alcoholic solution (of one-quarter of a grain to one hundred parts of alcohol and water). The case, which showed every symptom of putrid reabsorption, recovered.

In 1887, Sennett introduced a new treatment, which consisted in drawing off with a hypodermic needle a small quantity of the fluid (about seven grammes) and replacing the liquid drawn by an equal quantity of a solution of the bichloride of mercury, which contained .002 of the active drug.

In France the antiseptic methods became general from 1888. The present treatment can be divided into three methods:

The *first* consists in completely emptying the sac and washing the same out thoroughly by some antiseptic solution.

The *second*, of drawing off only a small quantity and replacing it by an antiseptic solution.

The *third* is a mixed process, which consists of emptying the sac and replacing the liquid by an antiseptic fluid.

The object of all is to kill the hydatids and to prevent suppuration,

and also to prevent, as far as possible, the poisonous effects of the antiseptic liquids used.

By Mésnard's method, after having taken all antiseptic precautions by washing the skin, etc., at the point, a puncture is made into the sac by means of a No. 2 needle of Potain's instrument. Aspiration is then performed, and the sac is emptied as completely as possible; then, without changing the needle and by using the return force-pump, you inject the antiseptic liquid, which is left in the sac for a few minutes, then withdrawn. This operation has caused mercurial poisoning, diarrhoea, etc. In a case where two hundred grammes of Van Swieten's solution were used and left in the sac for ten minutes, the patient an hour afterwards swooned and shivered and was taken with acute mercurial stomatitis, followed by continuous diarrhoea and albuminuria.

This led to replacing the mercurial solution by one of sulphate of copper (five per cent.), which gave good results. Juhel-Renoy uses naphтол with excellent effect. In all the cases of substituting an antiseptic liquid for the fluid in the cyst we have no record of death from the operation. Hanot empties the sac, injects fifteen to twenty grammes of Van Swieten's solution (bichloride of mercury, one to a thousand), and leaves the injection in the sac, thus preventing by the smallness of the dose mercurial poisoning and an overflow into the peritoneal cavity. Even forty to fifty grammes have been used, and cure has been obtained.

We do not stop to remind you of the usual signs by which you recognize a hydatid cyst, but we must say that any diagnosis should be confirmed by making at least a small puncture and having a portion of the fluid extracted examined by the microscope.

You know that hydatid cysts are divided into two classes, the *unilocular* and the *multilocular*. The first are the kind seen in France. They may contain one or more hydatids and sometimes a large number of what are called "*daughter hydatids*." If it is a case without these small hydatids it will be almost completely emptied by one puncture, although any aspirating instrument can only take a certain quantity out, owing to the thickening of the membrane surrounding the hydatids and its adhesion to the walls of the liver.

On the other hand, when the number of small female hydatids is large, they quickly obstruct the canula and permit only a small quantity of liquid to come out. An examination of the liquid will set this right, and allow you to say whether the hydatids are dead or not, or whether the cysts are in a state of suppuration, thus giving you the elements of diagnosis and fixing your treatment. By the presence or

absence of albumen you can tell whether the hydatids are alive or not, as when they are living there is no albumen in the fluid.

It seems to me that Hanot's method of using moderate doses of Van Swieten's solution meets all the requirements, and is without danger. The second case, where only a small quantity is seen to flow, may occur also when there are a number of small sacs in the cysts, and the method adopted should be Sennett's or Baccelli's,—that is, to draw off only a certain quantity of the liquid and substitute the same quantity of bichloride solution; not in all, however, more than thirty grammes (about an ounce).

When there is albumen, operate in this way also. When the sac contains pus, the question is more serious, and has caused considerable discussion among medical men, physicians taking one view and surgeons another.

Potherat advises laparotomy and a single incision afterwards. In forty-five cases he had thirty-four cures, five partial cures, and six deaths,—a mortality of thirteen per cent.

Morin claims that washing out and the injection of antiseptic solutions gave him only two deaths in twenty-seven cases. This would show an advantage in what may be called the medical method, for in eleven of these last cases there was suppuration. It is true that laparotomy with antiseptic precautions offers but little danger, but it is very difficult to obtain the patient's or his family's consent to this rather important surgical operation, while they readily accept the puncture. Without being exclusive, we think that it would be well to try at least the milder operation, and if suppuration continues, bringing on secondary infection, then call in an experienced surgeon to open the sac thoroughly.

To sum up: We conclude that the best treatment is to wash the part carefully and apply to it a solution of bichloride of mercury. Then wash your own hands and disinfect the trocar over the flame of an alcohol lamp or in an oven. Clean your aspirator with boiling water and then with an antiseptic solution. (Potain's aspirator is best, as it will allow you to aspirate and inject also.)

Having emptied the sac as completely as possible, inject with the same apparatus Van Swieten's solution, not more than thirty grammes in all, and leave it there. Take out the trocar (we repeat trocar and not needle, as this last might wound the other organs). Put collodion on the wound and wrap the patient's body up in salicylated cotton-wool. He should remain perfectly quiet on his back for at least twenty-four hours. It is well also to give him some opium or a hypo-

dermic of morphine. As to food, give only some cold milk. It would be well also to clean the teeth and mouth with the following antiseptic solution :

R Boric acid, 25 grammes ;
Carbolic acid, 1 gramme ;
Thymol, 25 centigrammes ;
Spts. menthæ, 10 grammes ;
Water, 1 quart. M.

Following the puncture two things may happen : either it will cure the patient or the cyst will fill up again, in which case it may be necessary to continue the operation or repeat it a number of times, or should suppuration persist perform the more radical surgical operation.

A slight complication may occur,—*i.e.*, urticaria, a sort of nettle-rash that is probably produced by some of the toxic ptomaines in the liquid of the cyst, after the operation. These ptomaines are similar to mytilotoxine, as has been proved by experimental injections of the hydatid liquid that produced urticaria.

COLOTOMY IN THE TREATMENT OF STRICTURE OF THE RECTUM.

CLINICAL LECTURE DELIVERED AT THE KENTUCKY SCHOOL OF MEDICINE.

BY W. O. GREEN, M.D.,

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GENTLEMEN,—The case I wish to present to you is one of fibrous stricture of the rectum. It is complicated with a fistula that communicates on one side with the rectum and on the other with the vagina, a very obstinate form of fistula and one that gives the disease a serious aspect. By serious, I do not mean to intimate that the complication endangers life, but it creates distressing symptoms and renders almost all the forms of surgical measures inadequate to give the patient complete and permanent relief.

This case is very interesting and should therefore command your closest attention. It is interesting, first, because of the operation—colotomy—that has been performed, which I shall presently describe, and, secondly, because the patient has been suffering with the disease for the last ten years, during which time she had had five extensive operations performed, together with almost all known forms of palliative treatment, by some of our most prominent surgeons. After all this, she presented herself at the clinic with her rectum blocked up with a tremendous mass of cicatricial tissue, and an opening not much larger than an ordinary lead-pencil, through which to pass the motions from her bowel. Her present condition does not necessarily reflect discredit upon my predecessors who have operated upon her. It rather emphasizes the fact that in the ordinary forms of treatment, which are frequently long and tedious, this class of patients will not often persist

in having themselves attended long enough to derive the maximum of benefit. It emphasizes, also, that frequently, in spite of the most approved treatment, the disease will return in a few months and flourish again in its original strength.

You will not treat many of these cases before recognizing the fact that they can be placed on the list, you will no doubt make, of the diseases that are the most difficult the surgeon has to treat. Stricture of the rectum is proverbially known as an obstinate and intractable disease, and many of our best surgeons believe it altogether incurable. I cannot subscribe to this last view, but believe that a very large proportion of the cases which come under the care of the surgeon, especially when complicated, are quite incurable, while a certain other proportion will yield from the first to treatment and result in a cure, the pathological changes almost if not entirely disappearing. I believe also that the latter class is very small, when we measure the cures by the complete disappearance of the pathological conditions.

Strictures of the rectum may often be relieved and the symptoms which made them formidable disappear, and yet a fibrous deposit remains in the coats of the organ. This condition can be easily explained when you remember the size of the pouch of the rectum, and bear in mind the fact that it often requires quite an extensive deposit of tissue to produce obstruction. This offers, as you can readily appreciate, a contrast with the urethra, which requires only a small amount of deposit to bring about complete obstruction.

In selecting the most desirable form of procedure for a given case, you should always take into consideration two cardinal principles. These are the location of the stricture, and whether or not any complications exist. If you do not regard these conditions, it will scarcely be possible to treat the disease rationally, and your treatment may result in some grave or irreparable injury.

For the purpose of convenience, then, all strictures of the rectum may be classed under two heads: first, those which exist high up,—that is, above a point say three and a half inches beyond the anal orifice in women, and four inches in men. This will be just a little below the lower border of the peritoneum, and will give probably some latitude for the reflection of this membrane. The disease below this point may be considered as a low stricture. The point of main importance to remember in this division is the possible presence of the peritoneum at the strictured point, and the chance of wounding or infecting it by the proposed operation.

In regard to the complications, I will only say that almost any

form of rectal malady may coexist with stricture, but the two that are most frequently found and are of most importance are fistula and ulceration. Whenever these complications are found, and it is practicable, they should always be treated in the usual way at the same time the stricture is being treated.

There are several different forms of treatment now practised by our leading surgeons, and generally regarded as the orthodox plans. First may be mentioned gradual or progressive dilatation. It consists in passing into the rectum, at stated intervals, bougies which are increased in size in accordance with the enlargement of the stricture. It is very similar to gradual dilatation with the steel dilators as practised in the urethra, and many of the rules governing the management of urethral stricture are also applicable in the rectum. I will say, however, of this method in passing that it is probably the most universally applicable to the various forms of stricture of this part, and at the same time one of the most commonly employed. As to the results obtained, they are generally slow in manifesting themselves, but frequently permanent in their effect.

The next form of treatment may be mentioned as continuous dilatation. This consists in passing into the rectum especially-constructed bougies, the size of which is a fraction smaller than the calibre of the stricture, and having the patient wear them from a few hours to several days at a time. The size of the bougie must be increased from time to time until the constriction has been stretched to the desired size. This method possesses many of the advantages of gradual dilatation, and, where it can be employed, is followed by more rapid results.

Electricity is sometimes employed with the method of gradual dilatation, thus forming a separate procedure. I have had up to the present time very little experience with this form of treatment, and will only mention it in passing. The bougies are made of metal, appropriately insulated, and when passed into the diseased organ a strong current of galvanic electricity is passed through the instrument and intervening tissues with the view of producing disintegration and promoting absorption. The method does not seem to have gained much popularity, and many of our best writers, who claim to have tested it, say that the electricity adds practically nothing to the treatment, and whatever benefit is derived is probably due to the mechanical dilatation alone.

Some surgeons are partial to forcible divulsion, which is practised by passing into the rectum a strong, heavy-bladed speculum, or a dilator especially constructed for the purpose, and expanding the blades until

the tissues give way and the fibrous deposit is torn through to the healthy tissue. This method should never be taken into consideration unless the disease is situated very low down in the rectum, and I believe it is seldom practised without danger. I have seen it successfully performed in several instances. We all know that when violent force is brought into play the stricture will necessarily rupture at the weakest point. It is not always possible to determine the location or resistance of this point, and it must follow that we cannot predict either the location or extent of the destruction that may be brought about by such a procedure. When you remember that in this method there is always a greater or less danger of complete rupture of the rectum, with the possibility of opening the peritoneal cavity, also of severe and troublesome hemorrhage, you should practise it only in those cases where the stricture is located just in or above the anal orifice, is of an annular nature, and in which the walls above the stricture are manifestly strong and free from disease. Even in these cases you must be exceedingly careful and endeavor to employ only such an instrument as will accurately gauge the amount of force, and limit the extent of destruction.

Theoretically, the method of internal division should recommend itself as an ideal treatment. But for the reason that it may incur a considerable amount of danger, it is seldom employed. The idea is to pass a knife into the rectum and nick the stricture in several places, and follow this by a daily passage of the bougie until the parts become permanently patulous. The danger from this method comes from the infection to the parts, which is due to the constant presence of septic material in contact with the wounded surfaces. In this procedure we do not have to contend only with the chances of general infection, but the wound may fail to heal and leave behind an obstinate ulcer, or perhaps an abscess may appear and result in fistula. These dangers are not chimerical, and if you will take the trouble to investigate, you will find that literature is not wanting to sustain the points I have brought out. However, the method has been sometimes practised with safety where small, thin bands of fibrous tissue are found, and in these instances it can often be employed to advantage, and perhaps with a minimum of danger.

We are indebted to Vernueil for complete division of rectal strictures, and when the disease is not located above the point of peritoneal reflection, this method affords probably one of the best surgical means we have at our disposal. It offers practically what theoretically the method of internal division at first thought might appear to give.

The operation is performed by passing a long knife, known as a proctotomy knife, well above the stricture on the finger as a guide, and making an incision through the entire mass of tissue down to the anterior surface of the sacrum, and coming out near the tip of the coccyx. It will be seen, therefore, that both healthy and unhealthy tissues are divided from the highest point of the stricture as far down as the tip of the coccyx, including both sphincters, and a broad grooved opening is left that is frequently large enough to introduce one's hand into. In this way good drainage is established, and by careful syringing each day, the dangers of septic infection from retained discharges, or of ulceration and fistula are reduced to a minimum. Should the incision be made in the median line the risk of serious hemorrhage is slight, and if it should occur the parts can be more readily exposed for search of the bleeding point, or more easily packed in this method than when internal division is practised.

In those cases where dilatation is inadequate or else impracticable, where the stricture is found below the peritoneal reflection, or where severe ulceration or fistula is present, complete division or posterior linear proctotomy, as it is called, will be found most beneficial and frequently may offer the only means, short of colotomy, that will promise any hope of relief.

Some writers think quite highly of excision or extirpation of the entire stricture, either through the sacrum or by entering the parts from the anal region. This method was at its zenith, for simple strictures, two or three years ago, but it seems now to be on the decline in the frequency of its employment. The mortality from the operation is very high, and the complications that may ensue are many and often dangerous. Weighing the disadvantages against the advantages that may be derived, I believe we would scarcely be justified in giving it preference over the other methods except in a few selected cases, where the stricture is high and proctotomy or dilatation is impracticable. Should the stricture be of the malignant type, however, this method is second to none, and, in the majority of instances, offers the only hope of cure that we have.

Another method of treatment has been recently brought forward by Dr. Murphy, of Chicago. The operation is a very complicated one, requires instruments especially constructed for the purpose, and considerable preparation. The abdomen is first opened, or a sacral incision made and a piece of the bowel that will reach below the strictured point is brought down in a sort of elbow fashion. This piece of intestine is punctured and half of a Murphy button made fast in its

walls. The sides to be brought in contact are then scarified and united by a few sutures. The second half of the button is then passed into the rectum on a longer instrument and the two united by pressure. When the button comes away, several days later, a long clamp is passed into the rectum and made fast on the coapted edges, one blade going through the opening made by the button and the other remaining in the rectum, sometimes going above the stricture. The blades of the clamp are brought firmly together and left a few days, tightening them each day, until all undivided tissue is severed and both sides of the intestine freely communicate with each other. I have had no personal experience with this method, but from the literature I have been able to gather, I cannot believe it will ever gain much favor in rectal strictures. It is complicated, tedious, requires special instruments, and not without danger. When compared with the other methods it seems to have little to recommend it. However, we need further investigation with this procedure to establish its place among the other forms of surgical treatment.

Lastly, from a surgical stand-point, we have colotomy as a means of treating stricture of the rectum. Colotomy means going into the abdominal cavity above the strictured point and bringing to the surface a piece of intestine, and stitching it to the abdominal wall. After the bowel has remained outside the abdominal cavity long enough to become united by plastic adhesions, it is opened and all action is passed through the side instead of the rectum. In other words the bowel is tapped above, and the rectum left a passive tube whose function is no longer required. This method does not cure the stricture, but relieves the most distressing symptoms and does away with the chance of a complete obstruction and the risk of a horrible death that might ensue from this cause. However, this method should not be resorted to until all other means of treatment have been tried and found insufficient, or else proved from the first useless to attempt. Since this is the operation that I have performed, it may add interest to the case to state when it is indicated. The scope is quite wide, and it may be said that colotomy is called for in those cases of long-standing stricture with severe ulceration and extensive fistulæ, that are manifestly incurable, and endanger life. Also in cases of extensive fistulæ running high into the pelvic cavity, or communicating with the genital tract; in high strictures or those due to pelvic tumors which threaten life by obstruction and extensive ulceration, in which other methods have proven of no avail. Lastly, it may be employed in malignant growths where excision cannot be practised, and in congenital atresia.

We will now take up the history of the case, the main details of which I will give you as they appear in my records.

H. C., female, aged thirty-eight, a large robust woman of ruddy appearance, but a markedly nervous disposition. She says that she enjoyed good health up to about twelve years ago, when she began to suffer with rectal trouble. At this time she lost considerable flesh and has never regained her former weight or felt her usual vigorous health. Her appetite is poor and whimsical, and she suffers a great deal from attacks of so-called dyspepsia. There is no history of syphilis and no symptoms of phthisis could be elicited. Barring the present trouble, she has never had any pronounced illness. She has had several children, all of whom died before they reached their fourth year. There have been two miscarriages, and both were brought on by artificial means. Menstruation has been more or less disturbed since the appearance of the rectal malady, and for the past three or four years she has suffered with leucorrhœa. Her father died at forty-eight from syphilis. Mother died at ninety-eight from cancer of the bowel. There were fifteen children, five of whom are living and enjoying good health except, of course, the patient. One sister died of consumption.

Patient states that from childhood she has suffered from constipation and does not remember the time when she was not compelled to take laxatives to keep the bowels acting comfortably. About twelve years ago, after the birth of her second child, she began to suffer with alternate attacks of diarrhœa and constipation, and when the bowels acted, which was brought about usually by purgation, violent straining and intense pain ensued. This condition continued three years, when she consulted a physician, who advised and performed an operation, the nature of which she thinks was a proctotomy, and which gave her relief for two or three years. Since that time four other operations have been performed, each giving relief from about six to eighteen months. Dr. Wimp performed the last operation, which he tells me was a proctotomy and required a division extending about four or four and a half inches up the bowel. He was called to see her again about six months ago, and found her suffering from complete obstruction of the bowel of a week's standing, and she had already begun to have stercoraceous vomiting. An entrance into the stricture was effected with a soft bougie, and with an injection of water and oil more than a gallon of fecal matter was discharged and the most distressing symptoms disappeared.

A few days later she applied at the clinic for relief, and after ex-

aming her I advised an operation, which she declined. Laxatives were then given, and the opening in the bowel kept patulous with a soft bougie passed two or three times a week. This was continued until the middle of August with no improvement in the stricture but rather an aggravation of the pain. Her health also became much depressed and she asked for an operation.

At this time there was constant pain about the rectum and vagina, radiating through the hips, up the back, and down the thighs. The pain was much aggravated by exertion or an action from the bowel, and compelled her to spend the greater part of her time in bed. There was a mucous discharge often mixed with blood which passed continually from the rectum, and was so profuse as to require her to wear a napkin constantly about the parts. One or two protrusions had appeared at the anal orifice and were swollen and tender. The bowels acted two or three times a week, but not without a previous administration of a purge or an enema. The actions were never formed, being hard, lumpy, and freely mixed with mucus and now and then streaked with blood. With each action there was always violent straining which lasted some time after the bowel was evacuated. A distressing incontinence was frequently felt, and when the motion was very liquid or attended with much flatus, a portion of these were passed from the vagina.

Examination showed the parts about the anus to be excoriated and tender from an ichorous discharge which constantly bathed the skin. At the anal orifice were two œdematous folds, one of which extended some distance up the mucous membrane. The external and internal sphincters were slightly patulous, flabby, and possessed very feeble contractile power. The mucous membrane at the anal verge was exceedingly sensitive, and the slightest manipulation gave rise to very severe pain. Between the sphincters a deposit of fibrous tissue in the anal walls could be plainly felt, probably more distinctly anteriorly than elsewhere. Passing the finger higher up the deposit became thicker and rougher and bulged out into the pouch of the rectum, stopping the progress of the finger about three inches from the anal orifice. At this point a narrow aperture just large enough to admit the tip of the index-finger could be felt. The mass was firm, dense, and closely adherent to the neighboring organs. The posterior wall of the vagina in its lower portion was wholly fibrous, and just internal to the vulvo-vaginal orifice could be outlined a small fistulous opening, while around its border several large hypertrophies were felt. Olive-pointed sounds passed through the opening in the rectum showed the

fibrous mass to recede gradually above the constriction, thus making the deposit wedge-shaped, the narrow point of the stricture forming the apex.

August 20 the patient was placed on the table in the dorsal position and anesthetized. All previous antiseptic precautions having been attended to, Dr. Buechel, who assisted me, washed the abdomen thoroughly with soap and water, using a nail-brush for the purpose, and followed this by a free irrigation with sterilized water and careful sponging with ether. Towels soaked in carbolized water were then carefully laid over the clothing above and below the exposed parts, the lower edges of which came in contact with the skin of the abdomen, thus preventing the exposure of any but aseptic surfaces.

Drawing the skin tense, the incision was made two and a half inches in length and crossed at right angles an imaginary line drawn from the anterior superior spinous process of the ilium to the umbilicus. Half of the incision was on either side of this line, the central point of which crossed an inch and a half from the process. The subcutaneous tissue was much thickened by extensive deposits of fat. A branch of the epigastric artery was severed, and bled quite freely, but was soon caught and closed by torsion. The dissection to the subperitoneal areolar tissue was accompanied by considerable oozing, but careful sponging brought it under fairly good control in a few minutes. The peritoneal coat was then brought to the surface and a nick made which penetrated the peritoneum. Passing the finger through the opening and using it as a guide, all the tissues were divided in both directions to the extent of the skin incision with a blunt-pointed pair of scissors. With a fine-pointed pair of dissecting forceps the parietal peritoneum was brought to the surface and stitched in several places to the skin with sterilized silk. The piece of intestine that first presented was the colon. This was pulled firmly out until no more would come, and the mesentery became quite taut. In drawing the intestine out in this manner several inches could be brought down from above, and this was immediately passed into the lower angle of the incision, thus limiting the amount of intestine to be stitched outside to two or three inches. To make sure there was no twisting of the bowel, I passed my finger up and down the presenting gut, in the abdominal cavity, as far as could be reached, employing the mesentery as a guide. The mesentery in this instance was of medium length, and when a suitable piece was secured it was anchored by a silk suture passed first through the skin, then peritoneum, through the mesentery, and finally penetrating the mesentery, peritoneum, and skin again and tied by a firm reef knot.

The protruding colon was then stitched carefully around to the skin and peritoneum in several places with interrupted sutures. Two of these sutures were passed at the ends of the incision first through the skin, then peritoneum, then including the upper longitudinal band of the colon and peritoneum and skin on the opposite side. In suturing the gut the greatest care was taken to pass the needle only through the serous and muscular coats, thus avoiding the mucous coat, the perforation of which would cover the thread with septic material to infect the line of suture, and possibly reach the other portions of the wound.

The tension in some places was quite marked, and before the suture had been drawn out to be tied had cut itself quite through, which necessitated a second introduction and a consequent loss of time.

When the suturing was completed the parts were freely flushed with sterilized water and thoroughly dried. The piece of colon then that remained outside the abdomen was about three and a half inches in length and showed no evidence of impaired circulation. In fact, the pulsating arteries could be distinctly outlined in several places, and the surface everywhere showed its normal pinkish hue.

A piece of sheet rubber was placed on the protruding mass, over the top of which were applied several large pads of sterilized gauze and cotton, and held in place by a firm, many-tailed bandage.

The patient stood the operation well, and showed no evidence of shock throughout the entire time. She took the chloroform nicely, although very nervous at first and greatly dreading it, but after the first few inhalations she did not struggle. The abdominal muscles remained quite flaccid, and once or twice only was there any evidence of spastic contraction, and this only for a few seconds at a time and very feeble.

The patient was then removed from the table and placed in bed, in the dorsal position, with a pillow under the knees to make her as comfortable as possible. Boiled milk and soda water were ordered every four or five hours, while weak tea was permitted to wash out the mouth in case of thirst. Other foods, water or ice, were not allowed. An assistant was directed to remain with the patient for an hour after consciousness returned, and in case vomiting took place to press the hand over the outside dressing, and institute firm pressure to prevent the bowel tearing away from its attachment. After that time she was directed to manage this for herself. Pulse 90, temperature normal.

With the return of consciousness, restlessness intervened and pain was complained of. At nine o'clock P.M., four hours after the operation, morphia sulphate, grain $\frac{1}{4}$, was given, a catheter introduced to

empty the bladder, and the patient allowed to turn on her side. This was followed by great relief.

August 21, temperature, morning, 99°; evening, 101.2° F.; pulse, morning, 94; evening, 112. Patient slept fairly well during the first part of the night, after which rumbling noises came on about the abdomen and was accompanied by pain. Bowel was slightly distended and tender in the region of the incision, and percussion gave a tympanic note. At 3.30 P.M. the pain had become more intense, and was accompanied by dyspnoea. The dressings were at once removed and the colon outside found much distended and oedematous. A small incision was then made in the protruding knuckle which was followed by the discharge of a great amount of gas. The patient began to vomit almost immediately, but in a few minutes the abdomen became flaccid, the pain disappeared, and she at once went to sleep. The incision, though short, bled quite freely, mainly from capillary oozing, but one vessel spurted and was caught and tied. The parts were redressed with cotton and the bandage applied.

August 22, temperature, morning, 98.8°; evening, 100° F.; pulse, morning, 90; evening, 112. She slept comfortably until three A.M., after which pain and dyspnoea brought on a disagreeable restlessness. At nine A.M. the dressings were again removed and the escape of gas gave great relief. Milk allowed in larger quantities, in addition to which was given small quantities of beef-tea and strained soup.

August 23, temperature, morning, 98.5°; evening, 98.6° F.; pulse, morning, 84; evening, 120. At the morning visit the protruding bowel was incised from end to end. Five vessels spurted, all of which were caught by artery clamps and one ligature was applied. The capillary oozing was very profuse, but was controlled by the application of dry aseptic cotton. Castor oil, half an ounce, was administered at eleven A.M., and at three P.M. a hard, lumpy action containing the seeds of fruit, eaten prior to the operation, passed without pain. An hour later the desire to evacuate the bowel came on again, and following an injection a second evacuation was passed without pain. Both actions came from the upper opening in the colon. The parts were then dressed with gauze, steeped in carbolyzed oil, and held in place by the usual outside dressings.

August 24, temperature, morning, 98.5°; evening, 98° F.; pulse, morning, 94; evening, 96. Patient placed on solid food.

August 25, temperature, morning, 98°; evening, 99° F.; pulse, morning, 88; evening, 92. Appreciable decrease in the size of the protruding mass.

August 27, temperature, morning, 98.5°; evening, 97.6° F.; pulse, morning, 80; evening, 130. At four P.M. chloroform was administered by Dr. Buechel. The protruding gut was caught up in the fingers and incised at both ends to a distance of three-fourths of an inch above and one inch below, the latter incision passed close to the abdominal wall on one side, while on the other a round flap was left to serve later as a valve for the aperture. A long clamp was then firmly applied to the remaining mass of bowel about one-fourth of an inch from the abdominal wall, and the tissues above cut closely away with a heavy pair of scissors. The excised mass was about three and a half inches long, three inches wide, and weighed approximately three ounces. No bleeding took place from the cut edges above the clamp which was left *in situ*. The wound was dressed at either end with dry cotton, a broad piece of oiled gauze was placed over the entire surface and held in position by a large pad of cotton and the abdominal bandage. When consciousness returned the patient complained of considerable pain, for which one-quarter grain morphia sulphate was administered. At eight P.M. the pain returned, and was accompanied by profuse perspiration and vomiting of a liquid substance mixed with large quantities of bile. Morphia sulphate, $\frac{1}{4}$ grain, was then administered, which gave relief in the course of an hour.

August 28, temperature, morning, 98.8°; evening, 98.6° F.; pulse, morning, 100; evening, 112-100. Patient vomited once or twice in small quantities through the night and the early portion of the day, and the pain continued though in a milder degree but quite constantly. At three P.M. the clamp was removed and immediately relief from pain followed, while the pulse-rate changed from 112 to 100 in a few minutes. Some difficulty was encountered at first in locating the two openings, but after a short search they were found and made patulous by the passage of the finger. The remaining bowel still continued œdematous; solid food begun again and a laxative was ordered to be taken daily.

August 29, temperature, morning, 98.6°; evening, 99.2° F.; pulse, morning, 82; evening, 88. Large, well-formed actions were passed with slight pain. Protruding mass of bowel greatly diminished in size.

August 30, urine passed voluntarily for the first time. Tonic pyrophosphite of iron, quinine, and strychnine prescribed.

September 1, patient has learned to dress wound and take care of the bowel, which discharges two well-formed actions daily. Soreness about the parts has disappeared. Full diet permitted.

September 3, patient allowed to get out of bed and sit up for a few hours each day. Irritation about the rectum was complained of, for which an injection of warm, carbolized water was passed into the lower abdominal opening. A portion of the fluid regurgitated, while the rest passed out at the anal orifice and gave relief. Two stitches were removed.

September 4, two weeks after the operation, patient felt strong and well, and, contrary to instructions, walked freely about the house; swept, dusted, and attended to other household duties with no inconvenience and with no untoward results.

September 18, patient has grown enthusiastic about her improvement. She has usually one action a day, which she has educated the bowel to pass about six o'clock in the morning before dressing, and feels no inconvenience from the artificial anus throughout the rest of the day. The condition of the bowel moving naturally each day has not existed for more than a year. When the bowel is ready to act she feels the desire about the rectum, as before the operation, and ample time is given her to make preparations before the motion is passed. She thinks she has a certain amount of control over the actions, and I believe she is quite right in her opinion, for when the finger is passed into the opening a contraction is felt, which grasps it quite firmly. It is probably also, that in retaining its sensitiveness, the mucous membrane acts as a sentinel to warn her of the presence of the fecal mass, so that she may be able to make a timely preparation for its expulsion. She thinks, too, that there is more control over the artificial anus than she had at the normal passage, and this also is quite likely, for the nerve-supply above is intact, while below, from a functional point of view, it has been greatly modified, the muscular contraction is lost, and the sphincters have become weak. Some pain existed about the outside of the protruded mass which I found due to the presence of two ligatures. When these were removed the pain disappeared, and now with the evacuation of the bowel not even discomfort is experienced.

She has gained considerably in weight, and her general health, she says, is better than it has been for the past five or six years. The pains about the head and pelvis have disappeared, and the teasing irritation in the rectum, which she has endured in greater or less severity for the past six or seven years, gives her no further annoyance. There is no difficulty in adjusting the pad or keeping it in place, and she can now go about where she likes and is strong enough to do heavy work, as an evidence of which she walked ten squares to-day with little fatigue and has been washing and ironing in the last two days, this being four weeks after the operation.

One difficulty only troubles her, this is the pain that is brought about by the stooping posture, and is due, I take it, to the extra tension on the mesentery which was drawn taut during the operation. This will no doubt disappear in a short time.

I have given you this case in detail because I believe it to be quite typical, and as a typical case it will not only impress upon you more deeply the line of surgical procedure, but teach you more fully its applicability and emphasize the most important points in the treatment. The clinician labors under the disadvantage of seldom being able to present typical cases, and is forced in consequence to bring out the peculiarities of the patient he presents. The didactic lecturer, on the other hand, must give a sum total of the various forms of treatment, emphasizing as best he can the important points, thus making it very difficult for you to grasp the entire treatment, and at the same time isolate that which is most useful. I believe that the history and presentation of a typical case offers the best solution to the problem, and for this reason I have brought this case to your attention and given its details.

[LATER.—September 28, patient continues in excellent health, and the pain due to the stooping posture has disappeared. She suffers no further inconvenience from leucorrhœa.]

CONGENITAL CYSTIC TUMOR OF THE NECK; LYMPHOMATA OF THE NECK; GENU VALGUM; GENU EXTRORSUM; TUBERCULAR ARTHRITIS OF THE ELBOW-JOINT.

CLINICAL LECTURE DELIVERED AT THE CHILDREN'S HOSPITAL.

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GENTLEMEN,—The first of the series of cases which I present to you to-day illustrates a rare form of tumor of the neck, while the others illustrate the more common variety of tumors which you will frequently meet in surgical practice among children.

CASE I.—This little boy, James T., is one year old, and was brought to the hospital in the early part of the month. He presents a healthy appearance, except that you will observe two large elastic tumors occupying the left side of the neck and protruding posteriorly behind the ear. (See Fig. 1.)

These growths present many of the characteristics of cystic formations. The overlying skin is healthy, and there is no evidence of inflammation. There is a distinct sense of fluctuation communicated to the fingers. As yet these growths have given rise to no pressure symptoms, but their presence and rapid growth have alarmed the mother, so that she brings the child here for operation.

T. Holmes¹ believes that tumors of this character are almost always of the polycystic variety, and that the chief interest in their diagnosis and treatment centres around the proportion of solid substance which they contain. There can be no question that these cases are compara-

¹ Surgical Treatment of the Diseases of Children, published by Lindsay & Blakiston, Phila., ed. 1869, p. 26. Holmes's System of Surgery, Wm. Wood & Co., New York, ed. 1883, vol. iii. p. 882.



FIG. 1.—Congenital cystic tumor of the neck.



FIG. 2.—Multiple cervical adenitis of both sides of the neck.



FIG. 3.—Tubercular cervical adenitis.

tively rare, and, moreover, Gurlt¹ writes that very few of the recorded cases have been congenital.

Congenital tumors occupying this position are usually branchial cysts which may be one of three varieties: (a) mucous; (b) serous, and (c) sanguineous. They occur most frequently on the left side, and are occasionally intimately related with the larger blood-vessels.

The mother says that these growths were present at birth, but have been gradually increasing in size. Up to the present time they have caused the child no discomfort; but they now constitute a serious deformity, and the mother is anxious to have them removed. The mother states that the posterior growth has been enlarging most rapidly, so that I will attempt its removal first.

The removal of a growth of this sort from so young a patient is, of course, attended with considerable risk. In the first place there may be considerable loss of blood, and, secondly, the shock of the operation may be very pronounced. It is wiser, therefore, not to attempt the complete removal of these cysts at one operation. I will content myself with the removal of the posterior growth at this time, and postpone operation on the anterior tumor until a later period.

The child having been anæsthetized, I make an incision over the tumor, dividing the skin, superficial and deep fascia, and, as you see, the growth is exposed, and shows its cystic character. There are a number of cysts grouped together filled with blood-stained and amber-colored fluid. Several of these cysts appear to be filled with dark clotted blood. It is, therefore, a sanguineous cyst. The sac is very closely attached to the surrounding structures, and fibrous bands run down deeply into the neck. Some of these fibrous bands appear to be attached to the cervical vertebræ. The adhesions you see are so dense that some little time has been occupied in separating the tumor, and its base is still quite adherent. As the child shows marked evidence of shock, I will remove the tumor as quickly as possible, ligate the vessels which have been temporarily controlled by hæmostatic forceps, and wash out the wound with a bichloride solution (1 : 2000). I will next close the wound with a number of interrupted silk sutures, having introduced a drainage-tube to the most dependent portion of the wound. A pad of gauze, several layers of bichloride cotton, and a roller bandage complete the dressing.

Although the time consumed by the operation was not very long and the hemorrhage was trifling, you will notice that the patient is

¹ Ueber die Cystengeschwülste des Halses, p. 210.

very considerably shocked. To combat this condition the child will be surrounded by warm blankets, and a number of hot-water cans applied around it,—each can having been separately encased in a piece of blanket in order to avoid burning the skin. Aromatic spirits of ammonia will be given in ten-drop doses every hour until the child reacts.

Several years ago we had in the Boys' Surgical Ward the child of a Russian Jew, six or seven years old, who presented a somewhat similar tumor. There was a large bulging lobulated mass on the right side in front and behind the ear. The child's general condition was very good, and there were no other swellings or lymphatic enlargements anywhere about his person. Without an exploratory incision it was impossible to say whether the tumors were broken down lymphatic glands or some form of cystic growth.

The child having been given ether, a free incision was made from one end of the mass to the other, the external jugular vein ligated in two places, and the growth exposed. It was made up of a number of distinct cysts, which were filled with a clear amber-colored fluid. The adhesions of the growth were numerous, and extended down almost to the vertebral column.

On microscopic examination of the fluid removed from these cysts, a number of distinct echinococcus hooklets were discovered, showing that the growth was one of a very unusual variety. In considering the subject of *tænia echinococcus* in Treves's "System of Surgery,"¹ the writer believes that it is comparatively a rare disease in children. It most commonly attacks the liver, but may be found to occur in any connective tissue of the body.

After removal of the growth the wound healed promptly, and the child made an uninterrupted recovery. No recurrence of the growths has since taken place.

LYMPHOMATA OF THE NECK.

CASE II.—John R., aged eight years, developed a number of tumors on both sides of his neck some six months ago, and as they have enlarged rapidly until they have reached their present size (see Fig. 2), the parents bring him here for surgical interference. Some of these growths, as you can see, have reached the size of a hen's egg, and extend along the posterior border of the sterno-cleido-mastoid muscle. They are very nearly symmetrical on both sides, and are apparently

¹ Cassell & Co., pub., London, ed. 1895, vol. i. p. 821.

enlarged lymphatic glands. The glandular enlargement is, no doubt, due to a constitutional taint, a tuberculous diathesis. The cervical glands frequently become enlarged in children of this diathesis after an inflammation of the tonsils, scarlet fever, and even measles.

In the treatment of these cases, the cause of irritation having been removed and counter-irritation with the use of general systemic remedies having failed, their prompt removal should be practised. It is much better surgery to remove them before suppuration has occurred. When inflammation and the formation of pus have come about, it is almost impossible to remove the gland entire, and the subsequent course of the case is very much protracted. In this particular case (see Fig. 2) all the glands were removed thoroughly at one operation, and the wounds united with interrupted catgut sutures and an antiseptic dressing applied. The child's recovery was uneventful, and he left the hospital three weeks after the operation with the wounds entirely healed.

CASE III.—Samuel F., a colored boy, aged nine years, illustrates very well the most common variety of lymphatic enlargements in the neck. The tumor which you see on the right side directly below the ear (see Fig. 3) is made up of two enlarged glands which have broken down, and the neck is distended with a considerable amount of pus. Fluctuation is well marked. In the treatment of these cases, where all abortive measures have failed, there should be but one course of procedure. A free incision should be made into the swelling, the pus evacuated, and as much as possible of the broken-down gland removed by the use of the curette. The wound should then be packed with iodoform gauze and allowed to heal from below by granulation. We have now in the ward a case similar to this, in which a greater number of the glands were involved. The treatment pursued in this case has been the same. He is also colored, and you will find that these lymphatic abscesses and enlargements are very common in the colored race. Generally when the enlargement is well under way, no constitutional or local applications will be of any avail, and surgical interference is the only proper course. The removal of these glands is sometimes attended with great difficulty, and the surgeon should never attempt operation without every appliance at hand, and proper assistance to ligate the large blood-vessels and control any unusual hemorrhage which may occur. A very innocent-looking swelling on the surface may, when it is incised, be found to extend down and involve the sheaths of the large vessels. It is dangerous to operate on these patients and then allow them to walk to their homes a few hours

after they have recovered from the ether. It is much wiser to keep them under observation, for a day or two at least, subsequent to the operation.

GENU VALGUM.

CASE IV.—The next patient is a typical example of the diseased condition commonly called “knock-knee,” or genu valgum.

C. M., a colored boy, aged seven years, presents such a well-marked example of this disease as materially to interfere with his walking. The position of his knees as he stands in an upright position (see

FIG. 4.



A severe case of genu valgum.

FIG. 5.



The same patient after operation.

Fig. 4) is due to curvature of the femurs and hypertrophy of the inner condyles of these bones. This condition, you understand, is due to rickets, and you will observe that he presents many other symptoms of this disease.

In mild cases of knock-knee, braces, when applied early, may correct the deformity, or at least prevent further deformity of the parts. Proper braces, however, for this condition are very expensive, and re-

quire such constant attention that they are within the reach only of people of means.

The child was etherized and the antiseptic dressings removed from the seat of operation which were applied the day before, after thorough disinfection of the parts. In order to eliminate every possible source of infection, we again thoroughly scrub the skin in the neighborhood of the operation with soap and water, then cleanse the surface thoroughly with turpentine and alcohol, followed up by a little ether, and douche the part well with a warm bichloride of mercury solution (1 : 2000). It was my custom formerly to apply an Esmarch bandage to the lower extremity, and apply the Esmarch-tube several inches above the seat of operation so as to control the bleeding ; but I do not do so any more. I here do a linear osteotomy, and, having made an incision about half an inch in length two inches above the knee on the inner side of the thigh, I insert the osteotome with the blade about three-fourths of an inch in width and divide the bone, using a heavy wooden mallet, great care being exercised in dividing the posterior portion of the bone, which is in close proximity to the large vessels. The resisting force is supplied by a large sand-bag placed directly underneath the thigh. Having almost completely divided the femur by means of the osteotome, the remaining portion of the bone may be fractured by the operator's hands without the exercise of any very great violence. I slightly over-correct the deformity and apply a plaster-of-Paris bandage after having closed the small osteotome wound with a single stitch of catgut and a small antiseptic dressing. While the plaster is hardening we have the nurse hold the leg in the slightly over-corrected position to which I have already called your attention. The plaster-of-Paris dressing should remain in position for four weeks, and if there are no signs of suppuration it will not be necessary to change the dressing. Two months after the operation the union should be firm, and the patient should be able to use the limbs.

I repeat the operation on the other femur, and place it in a plaster-of-Paris dressing after slightly over-correcting the deformity. (The condition of this little patient two months after the operation is shown in Fig. 5.)

The operation which I performed in this case is that recommended by Macewen, and is simply a linear osteotomy through the lower end of the femur, the bone being divided about two inches above the knee-joint. It seems to me the best operative procedure to overcome these well-marked cases of knock-knee. Before this procedure came into

favor, the osteotomy recommended by Ogston found many supporters ; but it has fallen into disuse, because in following out his method the joint was frequently opened, as he recommends sawing off the projecting condyle and straightening the limb. Ankylosis of the knee was a frequent result. Macewen's operation is a comparatively safe procedure if the operator is careful not to divide important arteries or nerves. Union is prompt, as a rule. The most troublesome complication is suppuration, which may be produced either as a result of some neglect in asepsis, or may be due to some constitutional condition over which the surgeon has no control. I remember in one case, while I was dividing the bone, the osteotome opened up a deep-seated abscess which had given no external evidence of its presence. If suppuration occurs, necrosis of the bone may result, and a tedious healing ensue. As a rule, the results are very satisfactory.

GENU EXTRORSUM.

CASE V.—This little white girl, Amy G., aged five years, presented a well-marked example of the opposite deformity,—namely, genu extrorsum. (See Fig. 6.) Braces might have been useful to this child if they had been applied at an early age intelligently. I present her to-day to show the result following osteotomy. (See Fig. 7.)

I performed a linear osteotomy on both legs, and union occurred without any complications. The plaster dressings applied at the time of operation were kept in place for four weeks. The child was allowed to be up and about at the end of seven weeks.

TUBERCULAR ARTHRITIS OF THE ELBOW-JOINT.

CASE VI.—This patient, S. M., nine years of age, was admitted to the hospital with tubercular arthritis of the elbow-joint. Shortly after his admission his elbow was excised, but his condition did not improve. The elbow was very much enlarged, and presented a number of open sinuses leading down to the necrosed bone, from which there was a free escape of pus. (Fig. 8.) The arm was dressed carefully, and every means used to limit the inflammatory condition, but his elbow grew steadily worse. His temperature was of a hectic type, and he was losing ground rapidly by reason of the profuse suppuration. There remained no course to follow except amputation, which I accordingly performed on the 22d of September. The diseased arm was removed at about the junction of the middle with the upper third of the humerus.



FIG. 6.—*Genu extrosum before operation.*



FIG. 7.—*The same patient after operation.*

An interesting point about the case was that the lymphatic glands along the sheath of the brachial artery were much enlarged, and ex-

FIG. 8.



Tubercular arthritis of the elbow two months after excision.

FIG. 9.



Resulting stump after amputation above the elbow.]

tended almost up to the axilla. Some of them were as big as the end of my thumb, and quite a number as large as almonds. I dissected out as many as I could reach.

The wound healed rapidly, and the boy's general condition improved very much before he left the hospital ; and you notice that he now has a good stump following the amputation (Fig. 9), and is much improved in his constitutional condition.

SIMPLE STRICTURE OF THE PYLORUS AND ITS TREATMENT.

**CLINICAL LECTURE DELIVERED BEFORE THE STUDENTS OF THE YORKSHIRE
COLLEGE.**

BY MAYO ROBSON, F.R.C.S.,

**Professor of Surgery in the Yorkshire College; Senior Surgeon, Leeds General
Infirmary; Member of the Council of the Royal College of
Surgeons of England.**

GENTLEMEN,—The presence in No. 3 Ward of a case, and within the past month of three others, in which a simple stricture of the pylorus has been overcome and apparently cured by longitudinal division of the stricture with transverse suture of the wound, affords me a good subject for my lecture.

The disease is one which until comparatively recently would have been more fittingly discussed by one of my colleagues on the medical side, and even now it is only in the later stages, after medical treatment has been fully tried and failed, that such cases are transferred to the surgical wards. I fear it is an undoubted fact that the transference of cases to the surgeons is frequently delayed too long, the patient having experienced relief by medical treatment in the earlier stages, clinging to the hope that by perseverance with the old remedies he may be able to avoid operation, and so procrastinating until the last stage of exhaustion is reached, and the risks of operative interference are intensified.

In my present lecture I do not propose to consider the subject of malignant disease of the pylorus, but only to discuss the simple form of stenosis.

The etiology comes under one of the following headings :

(1) Fibroid thickening or cirrhosis. This may at times produce so much induration as to resemble a tumor due to malignant disease, and some of you may remember me performing pylorotomy successfully on a case of this kind, supposing it to be carcinoma, though on examination of the specimen microscopically no evidence of malignant disease could be found.

(2) The cicatrization of a pyloric ulcer is a common cause, and two of the cases I have recently operated on probably owed their origin to ulceration.

(3) Spasm of the pylorus is given as a cause, and in some of Loreta's cases, which were cured by simple stretching, it appeared as if muscular spasms were alone capable of producing stenosis.

(4) The contraction of adhesions outside the pylorus. I have operated on three cases of this kind, and in each case with success. In one the adhesions had been produced by local peritonitis dependent on attacks of gall-stones, in another apparently by intestinal ulceration, and in a third the cause was not evident. In none of these did I consider it necessary to open the pylorus.

(5) Kinking of the pylorus owing to adhesions fixing it tightly to the under surface of the liver and gall-bladder. At the present moment a case of this kind is under my care in No. 3 Ward. He was operated on a month ago and is now convalescent, he being now capable of taking ordinary food in full quantities.

(6) Polypus, partially occluding the pyloric orifice. This must be an extremely rare condition; in fact, the only case with which I am acquainted is at present convalescent from operation in this hospital, the case having been transferred to me by my colleague, Dr. Churton.

(7) It is said in some of the text-books that pyloric stenosis may be produced by the pressure of a tumor outside the pylorus as well as by an accumulation of foreign matter, such as hair, etc., swallowed by the patient.

The symptoms in all cases of simple pyloric stenosis are similar, as you will find if you compare the notes of the cases to which I have referred; and as a rule there will not be much difficulty in distinguishing between the malignant and the simple form, since the symptoms of the former extend over months and of the latter over years, though as in the case of intestinal strictures there may be exceptions to this rule.

The patient will, as a rule, complain of gradually-increasing indigestion, of unpleasant eructations, of gradual loss of flesh, and in the latter stage of vomiting at more or less irregular intervals; in extreme cases the vomiting being daily or several times a day, in less urgent cases at intervals of a day or two. The amount of the vomit is usually large, frequently several pints at a time. The character of the vomit varies with the length of time the food is retained in the stomach; if soon after ingestion it will be acid, and the food will be only partly digested; if at a longer interval it will be sour-smelling, frothy, and containing a large quantity of mucus, holding in suspension *sarcinæ*

and yeast fungi. Much stress has been laid on the presence or absence of free hydrochloric acid, and I think this has a certain importance, though it is not pathognomonic. If free hydrochloric acid be found in the vomit the case is probably not of a malignant nature, though the absence of free hydrochloric acid is no proof of malignancy.

The physical signs are of great importance, and upon them will depend the diagnosis, for with simple pyloric stenosis there is always great dilatation of the stomach, and usually hypertrophy of the muscular wall.

When the stomach is full, as, for instance, before a vomiting attack, succussion easily elicits a splashing sound, and if the patient be shaken from side to side this is also heard. When the stomach is full there may be a local protrusion of the abdominal wall, and in some cases abdominal resonance extends upward on the left side beyond the normal. Where hypertrophy exists there may be visible peristalsis, the violent contractions of the stomach being accompanied by severe pain. This was especially marked in one of my cases, where the pain was so severe as to require relief by morphia. Dilatation of the stomach may also be demonstrated by means of the stomach-tube, or by distending the stomach with gas, this being most readily done by giving a large effervescing draught in separate halves, so as to secure the giving off of carbonic acid when in the stomach.

Where there is thickening of the pylorus a sausage-shaped tumor may occasionally be felt in the epigastrium, the tumor varying in consistency at different times, it being hard when contraction is taking place, and at other times barely or not at all perceptible. This was specially marked in one of my cases, the condition being clearly demonstrable to the whole class. The previous history is of importance, and it will often be found that the patient can give a history of pain after food, and at times of vomiting of blood, two, three, or four years previously, pointing to ulceration; or possibly a history of gall-stone seizures, or of some inflammatory trouble in the right hypochondrium may be elicited.

Diagnosis.—Having detected dilatation of the stomach dependent on contraction of the pylorus, it is desirable to differentiate between simple and malignant stenosis, and this may usually be effected by noting the presence or absence of a pyloric tumor, which is usually recognizable by palpation if the disease be malignant, whereas in simple stricture a pyloric swelling can seldom be felt. Sometimes, however, even in simple stricture, the pylorus may be discovered either on account of fibroid thickening or because of adhesions around the stricture.

In one of the cases you have lately seen, a tumor could be felt on certain occasions and could not be found on others, this being apparently due to contraction and hardening of the hypertrophied muscle at or near the pyloric orifice. The history also is of great importance in making a diagnosis, for in malignant disease the gastric symptoms will probably only have been present for a few weeks or, at the outside, months, whereas in simple stricture they may have extended over several years.

Treatment.—In the early stages, the patient suffering from dilated stomach due to simple stricture will receive considerable relief by medicines directed to asepticing the stomach contents, and at the same time strengthening the muscular coat; a medicine to effect this purpose is usually found in bismuth and nux vomica. At the same time a dose of Carlsbad salts, given the first thing in the morning, both clears the stomach of anything that may have remained in it and acts on the bowels. After a time these simple means fail to give relief when a daily washing out of the stomach will usually give further help. Not the least important means of relief at this stage of the disease will be found in a carefully regulated diet, the food recommended being of a highly nutritious, easily digestible nature; starchy and sugary foods being avoided, and fluid being prohibited with the meals.

After a time, however, if the pyloric contraction increase, all these minor measures will fail, and some form of operation will be called for. In malignant cases, which are not concerning us at present, pylorotomy or gastro-enterostomy may be performed, the one or the other being selected according to the stage of the disease; but in simple stricture there are practically two operations to choose from: the first, dilatation of the pyloric orifice by stretching, known as Loreta's operation; the second, which you have seen me do in several cases, known as pyloroplasty,—an operation which I can very confidently recommend to you in this class of cases, not only because of its immediately good results, but because there is no tendency to relapse of the stricture afterwards.

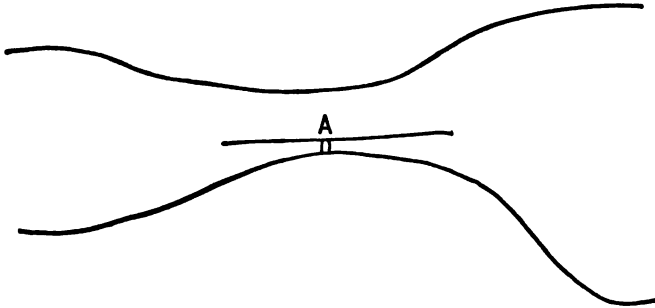
I think there can be little doubt that pyloroplasty will completely replace the operation of stretching the pylorus, since with no greater or perhaps even with less immediate risk, it affords a more certain freedom from relapse.

I have modified the original operation of pyloroplasty by the employment of the decalcified bone bobbin, and from the experience I have had in three cases, all of which recovered and are now well, I think I am justified in claiming for the modification greater safety, equal simplicity, and enhanced certainty; as the bone bobbin secures

an immediate and thoroughly patent canal, and affords protection to the newly sutured visceral wound. Time is saved by the use of but two sutures, both continuous ones; the one uniting the mucous margins, the other serous surfaces.

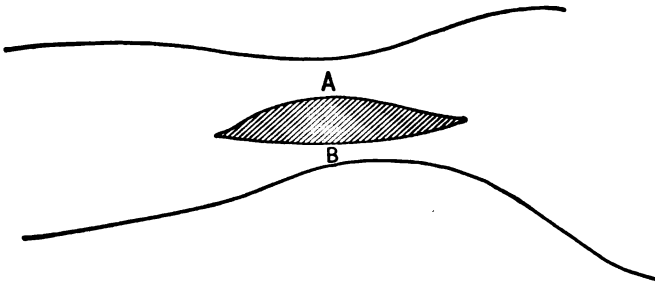
The following diagrams show better than words the old and the modified methods.

FIG. 1.



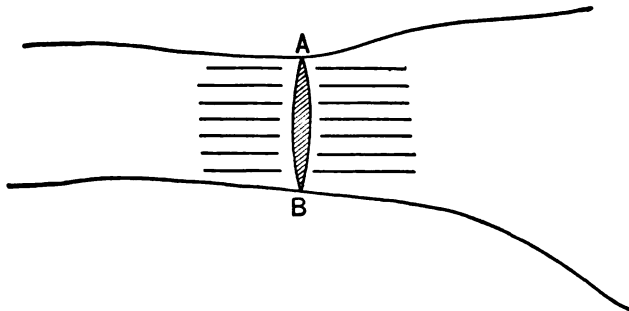
First stage.

FIG. 2.



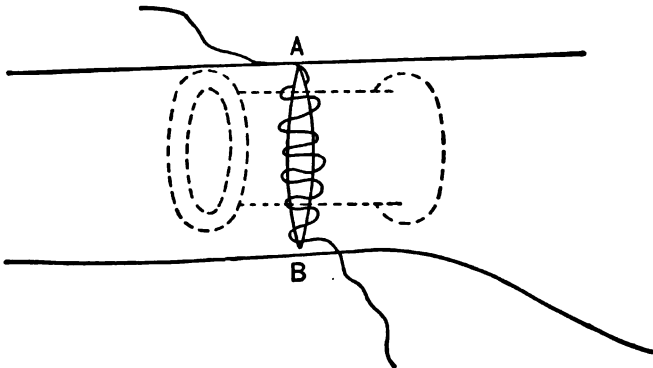
Second stage.

FIG. 3.



Third stage of the original method.

FIG. 4.



Third stage of the modified method as employed in the cases related.

With a little manipulative dexterity the operation of pyloroplasty can be done so quickly and with so little exposure of the viscera that post-operative shock need hardly be feared, and as the incision through the pylorus is through cicatricial tissue, there is little or no fear of hemorrhage; in fact, in some of the cases on which I have operated, not a single ligature was required.

The only difficulty, and it is one which may often be expected in these cases, is that the pylorus has to be separated from adhesions set up by the inflammatory process which has caused the stricture. I have found these to be better separated by the fingers than by scissors or scalpel.

It will be found to facilitate the application of the sutures if the longitudinal incision be made nearer the lower part of the anterior surface of the pylorus, so that when the slit is sutured transversely the upper angle is well within view. As regards sutures, fine catgut is the best for uniting the mucous margins, and fine silk for the serous stitch.

The detailed history of two cases has been sent to the *British Medical Journal*, and I need not give them again; but I may mention to you that the first was a man of thirty-four years, who gave a five years' history, and who had lost from two to three stones in weight. His chief symptoms were vomiting, painful cramps in the stomach and intestine, and great weakness. After operation he rapidly put on flesh, and within six weeks he had gained a stone in weight. He is now well in every respect.

The second case was in a man of fifty-two years, who gave the history of pyloric ulceration two years previously, since which time he had lost flesh and weight, and during the previous four months vomit-

ing had regularly occurred every second day. During the previous six weeks he had lost no less than a stone and a half in weight. After the operation he rapidly put on weight, and when he left at the month-end he had gained half a stone in weight. The patient is now quite well in every respect, and has regained his full weight.

The case on which my present lecture is based is even more remarkable, in that it is only a month since the operation, and the patient, who previously only weighed five stones seven pounds, now weighs seven stones seven pounds, he having gained a pound a day since the operation. He is taking ordinary hospital diet, and expresses himself as comfortable and well.

With regard to the after-treatment, no food is given by the mouth for twenty-four hours, then chicken-broth and milk and soda-water in small quantities. On the third day milk pudding, on the fourth day fish, and after that, all being well, ordinary diet is generally resumed. Do not forget that the dilatation of the stomach and want of tone in the coats of the stomach may need attention even after the obstruction is removed, and *nux vomica* before food, together with an occasional saline aperient in the morning, such as Carlsbad salts, may be found useful during convalescence.

In conclusion, gentlemen, let me impress on you the great utility of medical treatment in the early stages ; but let me caution you against deferring surgical measures until the patient is reduced to an extreme degree of weakness, since by so doing the risk of operation is seriously increased.

FRACTURE OF BOTH BONES OF THE FOREARM; VARICOSE LEG ULCER; A SIMPLE METHOD OF EPITHELIAL SKIN-GRAFTING.

CLINICAL LECTURE DELIVERED AT THE PRESBYTERIAN HOSPITAL.

BY JOSEPH P. TUNIS, A.B., M.D.,

Assistant Demonstrator of Surgery and Anatomy in the University of Pennsylvania;
Visiting Surgeon to the Dispensaries of the Children's, the Methodist
Episcopal, and the Presbyterian Hospitals; Member of
the College of Physicians of Philadelphia, etc.

GENTLEMEN,—The cases which I am about to show you this morning are such as you will frequently meet with in your practice, and, although they present no unusual features, careful attention to every detail of their treatment will not be time wasted.

CASE I.—James F., aged twelve, fell off a step-ladder some two weeks ago, and received in falling a fracture of both bones of the forearm, about the juncture of the lower with the middle third. The first dressing which was applied to his arm was a long upper splint, well padded, running from his elbow to the tip of the fingers, and a smaller one running from the wrist to the elbow. While this is a most satisfactory dressing in a great many cases, it is sometimes difficult to apply neatly, and has the disadvantage of allowing the patient to move his arm freely at the elbow. Fixation of the elbow is often of great service in securing perfect fixation of the broken fragments, and can never be a disadvantage unless it be maintained too long. In applying the dressing to-day, let us, therefore, use this well-padded internal angular splint, together with a small pasteboard splint, to the outer surface of his forearm. Oakum (Fig. 1) has been used freely for padding, and should afford comfortable support to the limb (Fig. 2). A primary roller is never used in fractures of both bones of the forearm. Having secured his arm in the best possible position on the splint, and having placed some small pieces of raw cotton at those points which require



FIG. 3.—Deformity in a case of fracture of both bones of the forearm two inches above the wrist.



FIG. 4.—The same patient after a month's treatment.

additional padding, the arm is now properly supported. We apply the pasteboard splint, which has been previously soaked in warm water, so as to conform properly to the part, and place a generous supply of raw cotton between it and the arm. This dressing may be retained, you see, very snugly by two or three roller bandages, being careful not to

FIG. 1.



Oakum padding for splint, to be covered with a roller bandage.

FIG. 2.



Support secured for skeleton of forearm by a well-padded splint.

make undue pressure at any one point. The splint having been applied, we will support the whole dressing by a broad handkerchief sling hung from his neck, and the patient need not report for four or five days.

These photographs (Figs. 3 and 4) show very well the deformity which was present in another case treated elsewhere,¹ and the excellent result which followed the proper application of splints. Shortly after the first picture was taken, the boy fainted, and developed an epileptiform convulsion of brief duration. His attitude is one of great distress in Fig. 3, showing all the more prominently by contrast with Fig. 4.

In the treatment of fractures it is well to see the patient every day for the three or four days succeeding the accident ; but after the swell-

¹ For permission to use Figs. 3 and 4 I am indebted to Dr. William B. Hopkins, under whose supervision the boy was treated at the Episcopal Hospital.

ing has subsided and union has commenced, visits of twice a week are quite sufficient. In this case, if all goes well and union takes place without any complications or deformity, we should be able to remove the splint at the end of four or five weeks, and then apply a plaster-of-Paris dressing to the forearm, allowing him the use of his wrist and elbow, while at the same time firm support is given to the parts immediately around the seat of fracture. It is well to remember that joints bear being kept immovable for at least four weeks without any attempt at limitation of motion as a rule, but after that time the synovial surfaces are apt to become adherent to a greater or less extent. It is for this reason that passive motion is practised in all fractures, wherever possible, at the end of two weeks. In this way, seven weeks having passed and good union having been secured, the plaster-of-Paris dressing may be removed, and simply a piece of soap-plaster spread on a piece of chamois-skin to the thickness of at least a quarter of an inch should be kept around the seat of fracture by a roller bandage, and the patient told not to make any great use of his arm for one or two weeks longer. In such a fracture as this the patient should be kept under observation for at least two months; and it is always a satisfaction to see your patient six months after all treatment has been discontinued, in order to observe the final result.

CASE II.—Michael F., aged thirty-four, has a fracture of both bones of the forearm just above the wrist. The seat of fracture can easily be located by the lumps of provisional callus which have been thrown out. The radius, you observe, is fractured at about the point of junction of the lower with the middle third, while the ulna is fractured about half an inch nearer the wrist. The treatment of this case has been similar to that employed for the preceding one, and it is now four weeks since the injury was received. The internal angular splint may be removed, passive motion practised, and sufficient turns of the plaster-of-Paris dressing applied to afford support for three or four inches above and below the seat of fracture. The application of this bandage, you see, allows the patient the use of his elbow and the free use of his fingers. Having retained this plaster-of-Paris dressing for two weeks, we will then substitute the soap-plaster for a week or two, then allow the patient to rub his arm night and morning with soap liniment, and keep a bandage applied to his forearm during the day, simply to remind him that the bones are not as strong as they were, and to prevent overuse of the arm. As there is no deformity in either of these cases, the ultimate result ought to be very satisfactory.

LEG ULCERS DUE TO VARICOSE VEINS.

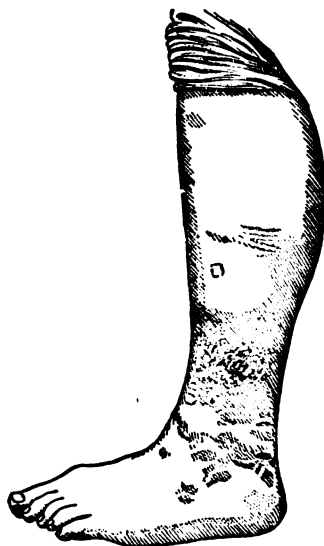
CASE III.—Mary McF., aged forty, has been suffering from varicose veins, of which you see a large bunch just below the knee, for two or three years. Occasionally one of these veins becomes inflamed. Breaking down of the skin follows, and a leg ulcer, such as you see just above the ankle, results. When these cases are neglected the ulcer may continue to spread until such a condition as is represented in the accompanying photograph (Fig. 5) is reached. Between this severe

FIG. 5.



Extensive ulceration of the leg.

FIG. 6.



The more common variety of leg ulcer.

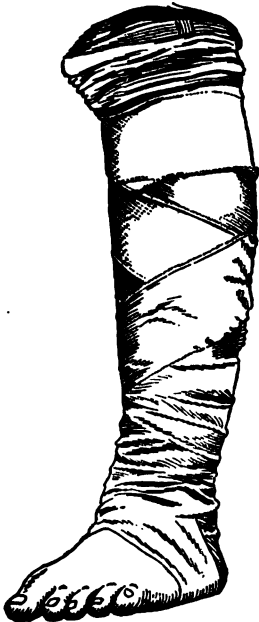
form of ulceration of the leg due to varicose veins and the mild form represented by this second case before us (Fig. 6) you will see every possible modification. It is hardly necessary to tell you that the sooner the disease is healed the better it will be for the patient. The methods of treatment for such a condition as this are very numerous, but the primary indication to be met is proper support for these dilated and engorged veins. Any local application to the ulcer itself which is cleansing, protective, and at the same time slightly stimulating will bring about ultimate healing of the part. An application which you will find very useful in these ulcers which have unhealthy granulations is a ten-per-cent. solution of boracic acid in glycerin, added to

enough bichloride gauze moistened by a one to two-thousand solution to cover the parts thoroughly. If this one to two-thousand bichloride solution is too strong, patients complain of burning pain as a result, and care should be exercised, therefore, to accommodate the strength of the application to the condition of the parts and the amount of raw surface exposed. Having thoroughly cleansed this leg, first with turpentine and then with alcohol, boro-glyceride dressings have been applied to this ulcer until it has taken on the healthy appearance which it now presents. By healthy we mean that the granulations are neither sluggish nor yet exuberant, but have a clean, flat surface which should promote rapid healing. At the same time the edges of the ulcer present a delicate white line, which is the new epithelium from the surrounding healthy skin endeavoring to cover the raw surface. In the treatment of all such ulcers as this no local application would be of any service without a properly-applied bandage from the toes to the knee. In people of her walk in life, who are obliged to be constantly on their feet while undergoing treatment, it is particularly important that the bandage which we apply should remain firmly in place. While this may seem a trifling detail, it is the key-note of success in the treatment of these cases, and it will be worth our while to demonstrate the practical application of a bandage which will remain in place until removed by the scissors. Commencing just above the ankle, one or two turns should be made to secure the roller; then carry the bandage to the base of the big toe, make one circular turn around the foot, and then two figure-of-8 turns to cover in the dorsum. The heel need never be bandaged unless the ulcer is in that locality, as the tissues there are so resistant that exposure between the rolls of a bandage never causes any swelling of the parts. One or two spiral reverses should be made immediately above the ankle, and the roller then carried diagonally across the leg up to the tuberosity of the tibia. (See Fig. 7.) A circular turn is then made around the leg at this point, and two or three figure-of-8 turns around the calf. This is the modification. The remainder of the bandage follows the turns of the ordinary spiral reverse of the lower extremity,—namely, proceeding back again to the ankle with spiral reverse turns, and up from that point until the entire limb is covered in. The number of turns may seem unnecessary as you have watched the application of the roller, but it is the only sure way to make the bandage remain firmly in position. It takes about two rollers, two and a quarter to two and a half inches wide, and six yards long. Having applied these rollers as neatly as possible, we will then apply two strips of rubber adhesive

plaster a quarter of an inch wide directly over the turns, crossing each other on the leg. (See Fig. 8.)

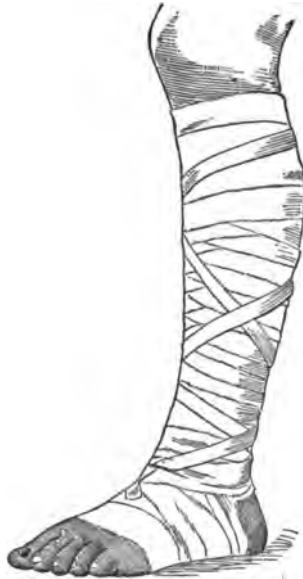
One great advantage of the boro-glyceride dressing in the treatment of these leg ulcers is that on subsequent application no cleansing

FIG. 7.



Anchor turns around calf to secure roller bandage.

FIG. 8.



Roller bandage of lower extremity completed by crossed turns of rubber adhesive plaster.

of the parts is necessary. The bichloride gauze is itself antiseptic, and the glycerin and bichloride solutions keep the parts in excellent condition. The glycerin in the solution seems to aid the healing process by softening the parts and at the same time stimulating them.

EPITHELIAL SKIN-GRAFTING BY A SIMPLE METHOD.

This woman's ulcer presents such a healthy appearance that it offers a very good opportunity for the trial of some epithelial skin-grafts. The ulcer is, as you see, about as large as a half-dollar. If we could excite a healing process from the centre of the ulcer, as well as from the edges, her ultimate recovery would of course be very much hastened. We will, therefore, cleanse her left forearm thoroughly, and remove some twenty or thirty small grafts with a razor from the flexor surface. This is readily done, as you see, with a straight needle, which has a

good sharp point inserted into the skin, and then a small graft about as large as the head of a white pin removed with the razor. It is necessary only to remove the epithelium of the skin, as that is the part which forms the protective covering. Theoretically, no blood should be drawn as these grafts are taken, and no pain caused by their removal. Practically, as in the case of Shylock and the pound of flesh, blood does well up from the point of their removal, and it is more or less a painful process, but nothing to be compared with the more extensive operation necessary in following out Thiersch's method. Having planted twenty or thirty of these small epithelial grafts about an eighth of an inch apart, it is only necessary to protect the surface with some ointment, which always acts better than an antiseptic dressing. In this case we will use some boracic acid ointment (twenty grains to the ounce), and over the ointment apply a few layers of dry gauze and the roller bandages, as before described, from the toes to the knee.

These grafts do not always take hold, especially when the patient is up and about at her usual employment. When the grafts do take root, however, and become distinctly visible, usually at the end of two weeks, healing is very much hastened. The method is very simple in its application, can do no harm, and may be of great service.

CASE IV.—Jacob von F., aged fifty, presents, as you see, an ulcer on the inner side of the calf of his right leg. He is a hostler by occupation, and during the warm months his feet and legs are kept constantly wet with the water of the stable. He has been suffering from this leg ulcer for two or three years, and has been constantly under treatment for it. The skin in the immediate neighborhood of the sore presents a glassy, shiny appearance, and the ulcer itself has a hard, cartilaginous look, as if there were a considerable amount of connective tissue around it. This will be a more difficult case to heal than the one I have just shown you. However, the same method has been followed in his case, and the granulations which are present now are, as you see, healthy, and there is very little secretion from the sore itself. There seems to be no constitutional taint. We will endeavor to promote healing by the same process of skin-grafting, and he is very willing to have his forearm used for that purpose. The bandage which we have been in the habit of applying to his leg has been removed only when he has come back to us again for a renewal of the dressing, and is a good test of the usefulness of the figure-of-8 turns with the spiral reverses over them, of which I have spoken. (See Fig. 7.) Often, upon the proper or improper application of the bandage itself, the confidence of your patient may be won or lost.

CASE V.—As illustrating the usefulness of these epithelial skin-graftings, let me show you this photograph (Fig. 9), which represents the condition of a mill-worker's hand,—namely, Isaac F., aged fifty. After the amputation of two fingers and the healing of a large wound of the palm, an extensive raw surface on the dorsum still remained. His friends volunteered to supply as many pieces of skin as would be necessary to promote the healing of the part, and accordingly upward of two hundred of these epithelial grafts were removed from their forearms, with very little discomfort to them and decided advantage to him. The photograph represents the condition of his hand some two

FIG. 9.



Raw surface on a crushed hand two weeks after grafting was started. The white dots represent individual grafts.

FIG. 10.



The same hand four weeks later, with the position of the thumb reversed. A firm cicatrix has formed.

weeks after the first grafts were applied, and they appear as white spots (see Fig. 9) on a red field.

The healing of his wound progressed rapidly, and in four weeks from the time of grafting he was discharged, cured. (See Fig. 10.)

CASE VI.—A patient with a very extensive burn of the thigh,¹ who was in the wards of the Episcopal Hospital while I was an interne there, was treated by the application of upward of three thousand of these grafts removed from the arm of her husband, who suffered no inconvenience from their removal, and attended to his work without

¹ A more detailed account of this case, together with the accompanying illustrations (Figs. 11 and 12), has already appeared in the *University Medical Magazine*, November, 1892.

losing a day. The photographs of this case speak for themselves. (See Figs. 11 and 12.) Thiersch's method of grafting was tried upon this case without any success, inflammation of the grafts taking place, and the patient was put to so much discomfort by the application of the antiseptic dressings that the method was abandoned altogether.

The process of healing was very much hastened by these epithelial grafts on this woman's thigh. If she had been obliged to remain in the ward until the burned area had skinned over from the edges, her stay would have been three times as long as it was. Two months after the second photograph was taken, she was discharged cured. The cicatrix has been a firm one, and has not since broken down.



FIG. 11.—Appearance of extensive burn of thigh, five months after the accident. The white spots arranged in two rows of three each are single grafts six weeks old; the smaller spots are four weeks, and the minute white dots ten days old.



FIG. 12.—Same denuded surface, six and a half months after the accident and about three months after grafting was commenced. The running together of numerous grafts is well shown.

EXCISION OF THE TONGUE BY A NEW METHOD, WITH NOTES OF A CASE.¹

READ BEFORE THE ABERDEEN, BANFF, AND KINCARDINE BRANCH OF THE
BRITISH MEDICAL ASSOCIATION.

BY J. SCOTT RIDDELL, C.M., M.B., M.A.,

Assistant Surgeon to the Aberdeen Royal Infirmary; late Assistant to the Professor
of Surgery, Aberdeen University, etc.

GENTLEMEN,—In a clinical lecture published in the Fourth Series of the *INTERNATIONAL CLINICS*, the writer, after a discussion of the differential diagnosis of cancer of the tongue and a description of the different methods of excision, gave notes of a case in which the following operation was performed :

“After dividing the tongue along the median raphe according to Morrant Baker’s plan, each half was removed by making a shallow incision with a scalpel across the dorsum and scratching through the muscular tissue with a sharp-pointed director until the lingual artery was seen. The artery being secured by a Péan forceps, the left half of the tongue was removed by one or two scalpel cuts. The right half was then similarly dealt with, only a few drops of blood being lost during the operation.”

While this operation proved most satisfactory in the case mentioned above, it seemed to me that a more certain method of arresting hemorrhage in excision of the tongue was desirable. The idea of a tongue-clasp then occurred to me, and I had one made to my design by Messrs. Archibald Young & Son, Edinburgh. I first tested the feasibility of the operation on the dead body, Professor R. W. Reid having kindly placed one of the cadavers in the dissecting-room of Aberdeen University at my disposal for this purpose. Dr. W. Findlay was good enough to take photographs of the different steps of the operation, and these are used to illustrate this paper. The extreme ease

¹ The continuation of a clinical lecture in *INTERNATIONAL CLINICS*, Vol. III., Fourth Series, p. 185.

with which the tongue could be removed by this plan and the complete control obtained over the lingual arteries were so apparent that I resolved to use the clamp in the first case I had. A case of malignant disease of the tongue suitable for operation did not come under my care for some time. In April of this year, however, such a case was admitted to the Aberdeen Royal Infirmary, and in it the clamp was employed, the success attending its use exceeding my expectations.

The plan of the operation consists in securing the lingual arteries by means of a clamp, the tongue being then quickly removed by scalpel or scissors. In so small a cavity as the mouth, a clamp large enough to secure both arteries simultaneously could not be easily introduced or worked. This difficulty is overcome by dividing the tongue along its

FIG. 1.



Clamp for excision of the tongue.

median raphé and dealing with each half separately. In total excision the left half of the tongue is removed first; in partial excision either half can be clamped as desired.

The clamp is slightly larger than the one shown in the illustration (Fig. 1). It consists of two blades, which on the screw being loosened spring apart sufficiently to admit the middle and index fingers side by side. At right angles to the handles are two blades for holding the tongue. The handles are ten centimetres in length, and the rectangular blades four centimetres. The upper blade is roughened on its lower surface, so as to grip the tongue firmly, while the lower blade, which has to perforate the tissues below the tongue and lingual artery, is like a flattened needle, sharp-pointed and smooth on both sides. The lower blade is four millimetres in width at its base, and gradually tapers to a fine point. The handles and blades are approximated by a powerful screw.

Description of the Operation.—By a handled needle two threads are passed through the tongue, about an inch behind the tip and half an inch on either side of the middle line. The thread on the left side is given to an assistant to hold, while the operator, standing on the patient's right hand, makes the tongue tense by pulling on the thread attached to the right side. He then scores the dorsum of the tongue

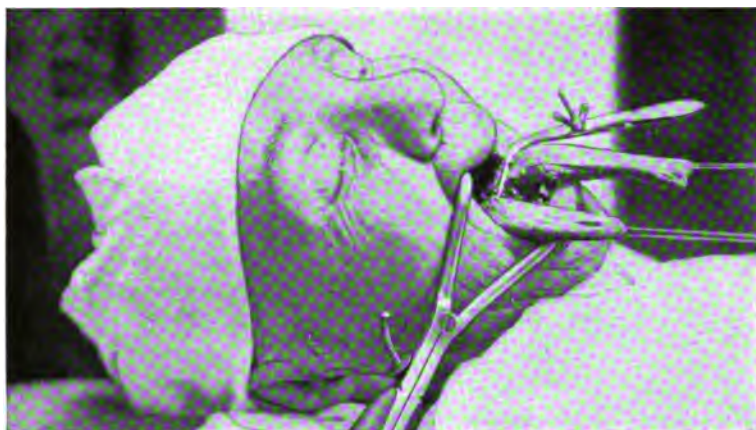


FIG. 2.—Position of the clamp in excision of the tongue.



FIG. 3.—Ligation of the lingual artery in excision of the tongue.



FIG. 4.—Application of the clamp upon the right side to control the bleeding of the lingual artery before removal of the remaining half of the tongue.

exactly in the middle line with a blunt-pointed scalpel, the incision passing through the mucous membrane into the muscular tissue below. This incision is made from the tip to well behind the posterior limit of the disease. Taking one of the threads in each hand, the operator with his fingers then tears the tongue into two halves along its median raphé. So far the operation is attended with little or no hemorrhage. The right side of the tongue is now released, and the operator, taking the fixation thread on the left side from his assistant, pulls the left half of the tongue towards the right side of the mouth, so as to expose its outer margin well behind the disease. The tongue-clasp is then taken in the right hand, and is held between the thumb and middle finger with its blades fully opened, the index finger being placed between the blades in front of the screw. The clamp, being held with its points directed slightly downward, is then pushed from left to right, so that the needle-like lower blade passes along the floor of the mouth below the lingual artery, while the upper blade shaves the upper surface of the tongue. The blades, having been placed in position to the satisfaction of the operator, so as to be well clear of the diseased tissue, are then tightly screwed together (Fig. 2), and all circulation on the left side of the tongue is arrested. By means of a scalpel the left half of the tongue is now removed by free incisions beginning about a quarter of an inch in front of the blades of the clamp. The lingual artery is easily seen on the end of the stump, and is seized with an artery forceps and tied (Fig. 3). The blades of the clamp are now slowly separated by turning the screw, and any bleeding point can be caught up by an artery forceps. The right half of the tongue is now, if need be, similarly dealt with, the clamp being introduced as shown in Fig. 4.

The operation requires only a few minutes for its completion, and is almost a bloodless one. It compares favorably, with regard to its safety and the ease of execution, with *écrasement* or any of the other methods in use. The following are the notes of a case treated by this method :

A. S., aged sixty-five, was admitted to the Aberdeen Royal Infirmary on April 13, 1895. The family and personal history are unimportant. The under surface of his tongue became irritated by some sharp decayed teeth on the left side of the lower jaw. He had to stop smoking from the irritation caused to the raw surface of the tongue by the juice from the pipe. The pain is confined to the tongue, and is often so severe as to prevent him sleeping at night. The anterior half of the tongue on the left side is infiltrated and irregularly ulcerated ;

on the lower surface it is partially bound down to the floor of the mouth. The submaxillary gland on the left side is enlarged.

The patient during his first week in the hospital had six severe attacks of hemorrhage from the ulcerated surface. The hemorrhage was arterial, and was checked with difficulty by plugging with iodoform gauze and with cotton-wool sprinkled with burnt alum. Excision of one-half of the tongue and of the submaxillary gland was advised. The enlarged submaxillary gland was first removed, along with a part of the jaw, by Professor Ogston's operation. The left half of the tongue was then removed by the method described above. No blood was lost during the removal of the tongue. The wound was plugged with sublimate gauze and drained through the submaxillary opening. The patient made an excellent recovery, and was dismissed from the hospital nineteen days after the operation.

THE OPERATIVE TREATMENT OF SEVERE TALIPES EQUINO-VARUS.

CLINICAL LECTURE DELIVERED AT THE UNIVERSITY OF PENNSYLVANIA.

BY JAMES K. YOUNG, M.D.,

Instructor in Orthopædic Surgery, University of Pennsylvania; Attending Surgeon,
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to the Home for Crippled Children, etc

GENTLEMEN,—In casting about for a subject with which to interest you, I was struck with the large number of severe cases of true club-foot which have been operated upon in this clinic, and I cannot do better than to show them to you, call your attention to the different indications for operation, and perform before you an operation of open incision for the cure of a severe case of talipes equino-varus.

The cases of club-foot include two cases of double enucleation of the astragalus, a case of old open incision, a case of recent open incision, and a case in which open incision will be performed to-day. These cases all represent the severest type of the most frequent congenital form of club-foot,—talipes equino-varus. You will remember that there are four primary forms of club-foot: the varus, the valgus, the equinus, and the calcaneus. If you divide the bony foot into two parts at the midtarsal or Chopart articulation, the anterior part of the foot, the pes proper, may be turned inward and upward, producing varus, or true club-foot; it may be turned outward and upward, producing valgus, or false club-foot; the posterior part of the foot may be drawn upward, producing equinus, from its resemblance to a horse's foot; it may be drawn downward, so that the patient walks upon the heel or calcaneum, producing calcaneus. These four simple forms may be combined, the anterior with the posterior forms, producing equino-varus, equino-valgus, calcaneo-varus, and calcaneo-valgus. To these may be added that condition in which the sole of the foot is elevated or arched, known as cavus, and that in which the sole of the foot is

flattened, producing planus. These represent all the different forms of club-foot, except what is known as the non-deforming club-foot of Shaffer. This is, in reality, an incomplete equinus which permits the sole of the foot to be flexed upon the leg to a right angle, but not beyond it.

The simple or primary forms of club-foot are very rarely met with, the forms being usually combinations of the different varieties. Of the congenital forms of club-foot, equino-varus is the most frequent, constituting about two-thirds of all the cases. From the study of a large number of cases of club-foot, it is found that both feet are more often affected than one, that the right foot is more often affected than the left, and that males are more frequently affected than females.

The form of club-foot which we will consider to-day is the congenital equino-varus, the most common form of congenital club-foot. The relative frequency of this form is about one in nearly two thousand births. When you consider the population of this city and its immediate vicinity, about two million five hundred thousand, you can readily estimate the number of these cases born within a few miles of us each year.

The milder forms of congenital club-foot can be easily overcome at an early stage by manual correction and by the use of simple apparatus, but in these severer forms, such as I show you to-day, the bones have become so much deformed, both from abnormal relations of the bones and from neglect, that something more radical has to be done to correct the deformity. There have been in all over sixteen different forms of bone-cutting operations performed for the relief of severe club-foot, and one surgeon has proposed by a crushing force to place the deformed bones in their normal position, breaking every bone in the foot if necessary. Another surgeon has suggested by means of an osteotome to cut every bone in the foot until they may be placed in a normal relation. Almost every bone has been removed, except the tuberosity of the calcaneum, which has probably been left because the tendo Achillis is attached to it, and it could not be removed without dividing that tendon. If it were not such a serious question, it would be amusing to study the different methods which have been proposed for the relief of this severe deformity; and I expect to hear some one in all seriousness propose to remove all the bones of the foot for the relief of this malady. Such severe measures are unnecessary, and the cases are very limited in which bone-cutting operations are imperative. In my opinion, they are never necessary before the seventh year, and are best performed about the thirteenth year. Of all the operations, but two

need now to be considered, because the others have been abandoned as either too mutilating or altogether inadequate to correct the deformity. These are the wedge-shaped resection and enucleation of the astragalus.

Wedge-shaped resection has not been performed at this clinic, because the removal of the astragalus has been given the preference, and because there are certain serious objections to its performance. It shortens the outer side of the foot; it opens and exposes to infection a large surface of cancellous tissue; it impairs the form of the foot, and the mobility, the usefulness, and the stability of the osseous arch. Removal of the astragalus is, however, free from these objections, the astragalus being the most deformed bone and being a bone which is free from muscular attachments. Its removal does not open the cancellous tissue, and the only objection to it as an operative procedure in these very severe cases is that it shortens the length of the limb from one-half to three-fourths of an inch. The incision is made in a curvilinear direction, commencing below the external malleolus at the edge of the peroneal tendons, and passing across the front of the ankle to within a half-inch of the anterior tibial tendon. This incision possesses the advantage of providing a greater opening than if a straight line were drawn between these two points. The articulation between the astragalus and scaphoid and the articulation between the tibia and fibula are opened, and by means of a blunt knife the bone is gradually enucleated from its bed, the foot being forced into a position of more marked equino-varus. When the anterior side of the bone is reached, great care should be taken to avoid wounding the posterior tibial artery, the bone being steadied by a pair of lion-jawed forceps and the operation being completed by the dull knife. If no cancellous tissue has been opened, it will not be necessary to insure drainage, but before the tendo Achillis is cut the Esmarch bandage should be removed to ascertain if the posterior tibial artery remains intact. All small fragments should then be removed, silkworm-gut sutures are inserted, and the foot is dressed in an over-corrected position. In some cases after the astragalus has been removed the bones will not fit between the malleoli, and the foot cannot be brought into a correct position. In these cases it is necessary to remove a portion of the malleoli and to insert a drainage-tube for a time.

CASE I.—The first case is that of a girl, fifteen years of age, suffering from congenital talipes equino-varus, who had spent her entire life in eleemosynary institutions. She was indentured to a clergyman's wife, but the occurrence of pregnancy in this lady, and the fear

of maternal impression producing deformity in her own child, led her to seek relief for this girl. She walked with one foot over the other, and could run like a deer.

FIG. 1.



Case I. before operation.

FIG. 2.

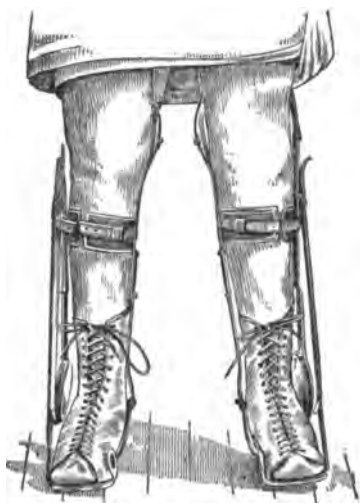


Case I. after operation.

The theory that maternal impressions produce deformity is one not to be entirely denied, but in the majority of cases you will find that

the fright or the observation of deformity occurred at a period of gestation when it could not have had any influence upon the production of deformity. The production of deformity by maternal impressions has been denied by some authorities, but there are a certain number of cases which would seem to point to an influence of this kind. You know that the feet assume a peculiar position in the earliest months of intra-uterine life: the thighs are flexed upon the abdomen, the legs upon the thighs, and the feet are rotated in the position of equino-varus. As gestation advances the tibiae rotate downward, and at birth the feet are in a normal position. To influence the position of the feet

FIG. 3.



Case I., with apparatus applied, two months after operation.

and prevent their rotation, the fright or observation of deformity by the pregnant mother should occur at a very early period.

You will observe in this case the position of the incision, which is as I have indicated it, and is now, at the end of the fourth week, entirely healed. In this case the bones went into their normal position after the removal of the astragalus and the section of the tendo Achillis, and it was unnecessary to remove the malleoli or to insert a drainage-tube. Both operations were performed by Professor De Forest Willard at one sitting, which has the advantage of saving time, and under strict aseptic precautions does not increase the shock of the operation materially. The amount of shock in these cases is equivalent almost to that which follows the Chopart amputation.

It has been suggested that this girl is deficient mentally, and the question at once arises whether or not this condition of club-foot from which she is suffering might not have been produced by cerebral palsy. She states that she has had the deformity since birth, and I have no doubt, from the condition of her feet, that her statement is correct. There are no other symptoms of cerebral palsy present in the case. If there had been a condition of cerebral palsy present, due to a birth injury to the cortex of the brain, it would have resulted in one of three conditions: an atrophy, a sclerosis, or a deficiency of cortical substance, producing what is known as porencephalus. If any one of these had been present it would have produced a rigid condition of the muscles of the lower extremity, with marked contractions of a post-hemiplegic character. In addition to the club-foot, there would have been a greater deficiency of thought and observation than that produced simply by environment and association.

CASE II.—The next case is that of a boy about ten years of age, who was sent here by express from the central portion of Georgia,

FIG. 4.



Case II. before operation.

suffering from an almost identical condition as the one just presented. It is a rare opportunity for you to see two such cases together, as these cases of severe club-foot are growing scarce since the introduction of modern methods of treatment. The statement has been made by Bradford that in no surgical condition can a cure be so confidently

assured as in the cases of true club-foot ; and the statement was made only a week ago by a surgeon of this city that no club-foot existed

FIG. 5.



Case II., after operation.

FIG. 6.



Case II., with apparatus applied, two months after operation.

but what could be corrected by means of a new mechanical appliance which he had been using. Both of these cases have been attracted to the clinic probably by the remarkable results which have been

attained by Professor Willard in this department. The operation was similar in almost all its details to the one which I have described, except that, it being found that after the removal of the astragalus the bones could not be placed in their correct position, because of the narrowness of the space between the malleoli, a portion of the external malleolus was removed, and the foot was then placed in a normal condition. It was necessary in this case to insert a drainage-tube for a week, after which it was removed. You see the line of the incision now is healed in both feet, except a very small sinus in which the drainage-tube was inserted. At each subsequent dressing the feet are forced into a more correct position than that in which they could first be placed, the object being to over-correct the condition, because after recovery there will be a slight relapse, and the feet will then be in a normal position for walking.

CASE III.—The next patient is one in whom the operation of open incision was performed upon the right foot a year ago in another city. She is a girl fifteen years of age, and states that ten different operations were performed upon the same part for the cure of severe club-foot. You see the line of incision is that in the position in which open incision is usually performed. The incision ends in front of the internal malleolus, and passes vertically downward to the sole of the foot. Through this wound all the different structures which come into view, and which hold the foot in its abnormal position, may be divided. These consist of the *tibialis posticus*, *flexor brevis pollicis*, *flexor longus pollicis*, *adductor pollicis*, and the *deltoid tendon*. The operation is performed by the bloodless method by the use of the Esmarch bandage and tourniquet. The foot is then forcibly placed in an over-corrected position, great force being used in some instances. Professor Phelps, who introduced this method, uses a mechanical appliance upon which a force of two thousand pounds, or a ton's weight, may be applied. It is unnecessary in most instances to apply such a severe force, and most of these appliances possess a crushing force which is damaging to the structures of the foot. After the foot has been forced into this position the *tendo Achillis* is cut, the wound is washed with bichloride solution, and protective is applied, also a gauze dressing, a bandage, and plaster of Paris before the Esmarch bandage is removed. In this manner it is often possible to obtain the healing of the wound by blood-clot, or the method of Schede.

The cases which have been operated upon in this clinic have been treated by packing the wound, after having ascertained whether there was any severe hemorrhage by removing the Esmarch bandage before

applying the dressings. This method requires more frequent dressing, but has the advantage of ascertaining at once the amount of hemorrhage which will occur and if any large vessels have been wounded. The foot is suspended for six hours to diminish the tendency to secondary hemorrhage.

When this girl applied at the clinic she had a contraction of the tendo Achillis, and also contraction of the extensor longus pollicis, and these have been cut and the foot forcibly placed into a much better position than it was upon her application.

CASE IV.—The next case is one in which the operation of open incision was performed in this clinic about three weeks ago. The line of the incision is, as you see, as I have described it. All the tissues were cut down to the bones, the foot was placed in an over-corrected position, and the wound was packed with iodoform gauze and allowed to granulate up from the bottom. The amount of scar tissue is, perhaps, greater, but as the scar is upon the inner side of the foot it does not receive any weight pressure upon it, and there is no pain produced in walking. The advantages of this method of open incision are that there is no bone tissue removed, there is no cancellous structure open for the absorption of septic material, and in the less severe cases it is sufficient to correct the deformity. If the skin is not too short, the same incision subcutaneously may be employed to divide all the structures down to the bone. In one case which was so operated upon here one year ago, in attempting to force the foot into its correct position the skin ruptured and the condition of artificial open incision was produced. Open incision was then performed upon the other side, and the healing in the two wounds was the same.

CASE V.—The last case is that of a child two years old upon whom I will perform the operation of open incision before you. It is a very severe and resisting case of equino-varus, which has already had two or three operations performed upon it. All the tendons have been cut, and a very extensive subcutaneous division of structures of the sole of the foot has already been performed. Notwithstanding this, the foot cannot be brought into a normal position. It resembles in this respect a very severe case which was under treatment here about two years ago, in which five or six operations were performed. These are the only two cases I have observed which have resisted the ordinary methods of treatment. The other case was an inherited congenital one, the father having been operated upon in Russia by the celebrated Pirogoff. He stated that after the operation the foot was dressed in a tin splint for four weeks, after which it remained in its normal condition.

I am inclined to believe that in these cases there is some fault in the spinal cord which produces this resistance to the correction: either there is a congenital absence of some nerve fibres, or there is a slight condition of sclerosis of some fibres resulting from a slight birth injury.

In a foot as small as this, it is difficult to distinguish the individual anatomical structures, but it is necessary to divide all the resisting tissues as you come to them, and after having forced the foot beyond the normal position the bandage is removed, the tendo Achillis divided, and the foot dressed aseptically and suspended in the crib for six hours.

These cases, two of double enucleation of the astragalus, two of old open incision, and one of open incision performed before you, illustrate well the modern treatment of severe equino-varus, and it is seldom that you have the opportunity of seeing so many severe cases on one occasion.

I am indebted to Dr. A. E. Taylor, resident physician, for the photographs with which this lecture has been illustrated.

HYDROTHORAX AND EMPYEMA.

CLINICAL LECTURE DELIVERED AT HOWARD UNIVERSITY.

BY N. F. GRAHAM, M.D.,

Professor of Surgery in the Medical Department of Howard University, Washington, D. C.

GENTLEMEN,—I take pleasure in bringing to your notice to-day a case of practical interest to all of you.

This young man is twenty-five years of age, five feet and ten inches in height, and weighed when in health about one hundred and sixty pounds. He weighs now one hundred and thirty-nine pounds. His family history is not pertinent to the case. He always had the best of health, and worked hard on a farm all his life until ten weeks ago, when he was taken down with what was called pneumonia, which, from the history he gives, must have been complicated by pleurisy. He tells us that he had difficulty of breathing, acute pains in the left side, constant cough, and expectoration of bloody sputum. Taking the history as given, it may be accepted that he had pneumonia with pleurisy, the latter being followed by an accumulation of fluid in the pleural cavity.

Serous effusions into the pleural sac are usually the result of inflammation, acute or chronic, of the pleura or lung, or both. Tumors, by causing pressure and obstructing the return circulation, may cause passive effusions. The presence of foreign bodies and the inflammation set up by them may cause the trouble, and become of surgical interest through the measures necessary for their removal. Suppurative pleurisy is the form of the disease in which the pleura secretes pus instead of the serous effusion found in the simple form. The term empyema means a collection of pus in the pleural sac when not qualified. Fluid of whatever character—blood, serum, or pus—in the pleural cavity presents about the same signs. The patient is inclined to lie on the affected side, as this gives the sound lung more play. The motion of the affected side is limited, and the intercostal spaces bulge, or at least the rib-spaces are well filled. The heart is displaced more or less according to the amount of fluid in the cavity ; to the left if the accumulation be in the

right cavity, to the right in left-sided accumulations. A greater degree of displacement can take place to the right than is possible to the left. A large amount of fluid in the right pleural cavity may displace the liver downward.

While the patient is standing, percussion shows dulness from the base of the lung to a line just above the level of the accumulation. When recumbent, the percussion note is dull posteriorly and resonant anteriorly, the reverse being the case when the patient lies on the face. If the accumulation fill the entire pleura there will be dulness everywhere. If the chest wall be oedematous the contained fluid is purulent, at least this has been given as a diagnostic sign. Measurement shows the affected side to be larger than the sound one. This difference in size, together with the area of dulness, gives a very good idea of the amount of the accumulation, as is manifest in the case before you. The left side, which contains the fluid, measures three and one-half inches more than the right, and in the standing position the dulness reaches to within two inches of the clavicle, so that the amount of the fluid must be very large. Auscultation reveals an exaggerated vesicular murmur over the right lung, whilst over the left side the respiratory murmur is very weak in the apex, and absent from a point an inch and a half above the nipple line downward. Vocal fremitus is absent.

When all or most of the signs enumerated are present, the diagnosis of the presence of fluid is quite conclusive. Although there is no doubt about the presence of fluid in this man's case, in order to determine its character I will use this large hypodermic syringe as an aspirator. I find that the fluid withdrawn is purulent. It might happen that a needle of this size would become plugged by a clot of blood or flake of pus; but even so, in the presence of all the signs enumerated and found here, the diagnosis would not necessarily be negative were no fluid withdrawn. In that event we should try a larger needle.

This, then, is a case of empyema,—a collection of pus in the pleural cavity. The term empyema is often applied to a collection of pus in any cavity, but unless the cavity be specified it is now generally understood to mean pus in the cavity of the pleura. Inflammation of the pleura followed by serous effusion, if contaminated by pus-producing organisms from the lungs, from a penetrating wound of the chest-walls, or through the general circulation, may result in a purulent or sero-purulent exudate. We have plastic and serous transudations, and the formation of new tissue in non-purulent pleurisies; but, in addition to these conditions, in the purulent variety there is shedding of embryonic and endothelial elements, migratory leucocytes, and other formed ele-

ments of the blood, which go to make up the pus exudate,—the empyema. If a collection of pus does form in the pleural cavity there are conditions which may follow ; for instance,—first, its fluid portion may be absorbed and the solid part caseate and cement the surfaces of the pleura together, and finally in this way disappear and result in recovery. Secondly, more pus may accumulate and go on filling the cavity until the symptoms become so urgent as to require surgical aid. Thirdly, the pus may evacuate itself into a bronchus, and empty itself, through the lungs, by the mouth. Fourthly, it may point on the chest wall or even below the diaphragm, and escape through the wall of the abdomen as low as the pelvis.

With our present means of making an accurate diagnosis such conditions are not often met with. It is now accepted that all purulent pleurisy is due to the presence of microbes. The species is not the same, however, in all cases, and each species, being endowed with special specific properties, will act in its own way and differently from the others. There are four distinct varieties of purulent pleurisy : 1, those due to pneumococci ; 2, those due to the streptococcus pyogenes ; 3, those due to saprogenic organisms,—putrid pleurisy ; and 4, those due to the bacillus tuberculosis. If we know the nature of the micro-organism causing the pleurisy, it aids us materially both in making a prognosis and in deciding on the method of treatment. The pleurisy and effusions due to the pneumococcus are quite amenable to treatment, for the reason that this germ has no active pyogenic tendencies, so that it is found that simple aspiration, or, failing with this, a pleurotomy, will, as a rule, result in a complete cure, or the fluid may be absorbed, as already stated. The empyemas due to the staphylococcus and streptococcus progress step by step from bad to worse, and the fluid never disappears by absorption, as is so commonly the case in hydrothorax, and as is occasionally true of the effusions associated with the pneumococcus. They require free opening into the chest and free drainage, with antiseptic irrigations of the pleural cavity. It requires a bacteriological examination to make a positive diagnosis as to the kind of pleurisy, which can be completed in three or four days. Such an examination has been made in this case, and the effusion is found to be associated with the pneumococcus only, and is as yet free from staphylococci or streptococci. Either of the latter may, however, at any time contaminate the present effusion, which is of a comparatively benign character, and add to it the destructive and progressive tendencies inherent in the more vicious germs. Taking a surgical view of the case, there are usually three methods of dealing with the condition

before us,—viz., paracentesis thoracis, thoracotomy, and thoracoplasty. The last becomes necessary in the event of the surgeon meeting with an old empyemic condition, with an encysted collection of pus in the pleura, or where a spontaneous opening has occurred, so that he has to deal with a fistula in the thoracic walls which discharges pus irregularly, sometimes more and again less.

The difficulty in the way of healing in these old cases of empyema is that the pleura has become hard and inflexible, and the lung has become fixed in the position into which it was forced by the accumulating pus. It follows, then, that even if the cavity be emptied and plenty of room left for the lung, it cannot expand to fill the cavity, owing to adhesions, nor can the chest wall fall to the lung, by reason of the unyielding ribs; so that it is often impossible, without the last-mentioned method of operating, to get the pulmonary and costal pleuræ in contact. That is to say, the chest space must sometimes be so reduced that the lung when expanded will fill it. It is in such cases that the method devised by Estlander—thoracoplasty—must be resorted to. This consists in dividing a number of ribs and, if the cavity be large, in removing portions of them. The number, of course, depends upon the size of the cavity. Sometimes it is necessary to resect a portion of each rib from the third to the ninth. The operation is done by making an incision from the axilla downward to a point below the last rib to be divided, and severing each rib from below upward. If the space between the lung and the chest wall is shallow, the simple division of the ribs is sufficient; if deeper, a proportionate amount of each rib should be removed. Exceptionally it may be necessary to divide three or four ribs in front, and from three to six behind; but this makes a very severe operation, as it opens the chest in front and behind. We have practically to deal with the wall of an immense abscess, and it should be treated after the operation by leaving the wound open and packing with gauze. The main object is to cause healing by granulation and adhesion of the granulating surfaces, so as to draw the two sides together,—the chest wall inward and the lung outward. Even in such severe cases the function of the lung is often restored to a great extent.

Thoracotomy is a much less formidable operation, and consists of an incision, two or more inches long, through the skin over an intercostal space. Any space from the sixth to the eighth may be taken. The opening through the pleura should be from half an inch to an inch long, every aseptic precaution having been taken. Before dividing the skin it should be slid upward about an inch, in order that when it falls back into place it may act as a valve, which may be of advantage after

the drainage-tube is removed. After incising the pleura and evacuating the fluid a drainage-tube should be inserted. If the pus or fluid discharged be not offensive, irrigation of the cavity is not necessary; but if offensive it may be cleansed with a 1 : 5000 mercuric chloride solution, followed by copious irrigation with sterilized water. The tube or tubes, if more than one be used, can be kept in place by stitching them to the skin. A safety-pin would serve the purpose of preventing the tube from dropping into the cavity and getting lost; but in a drain in this place it is necessary so to fasten it as to prevent it dropping out. The length of the drain should be sufficient for it to enter fairly well the pleural cavity and not protrude much beyond the surface. An important object of the drainage-tube is to prevent the closing of the opening until the discharge from the cavity ceases. In some cases the ribs are naturally so close together that there is not room for a sufficiently large tube. In such cases it is necessary to resect a part of the sixth or seventh rib, about an inch being removed, which gives all the space necessary. When an empyemic cavity has been evacuated and washed out, an abundant, absorbent, antiseptic dressing should be applied, and retained by an elastic bandage. The dressing should be changed as often as it becomes saturated, a daily dressing being, as a rule, required at first.

In the case before us, as I have already said, we have a pneumonic empyema, and as many such get well with one or moreappings, we will give him the chance of this simple method of operating. I now proceed to aspirate the fluid by introducing the sterilized needle between the sixth and seventh ribs, just below the angle of the scapula. The skin is pushed upward and made tense, and the needle quickly thrust into the cavity. Caution should be exercised in forcing the needle in, lest it go too far and wound the lung. A fair estimate can be made of the thickness of the walls, and this, in connection with the lessened resistance, will enable you to tell when the point has entered the cavity. The stopcocks are opened and, as you see, the fluid flows freely into the receiver, which being marked to show the ounces will enable us to tell the amount evacuated. . . . Eighty-four ounces of fluid have been removed, and the patient is in good condition, having been able, with the aid of a little stimulation, to remain in the sitting posture during the entire operation. An examination of the chest shows that the lung is expanding, and we shall expect with rest, nourishing diet, and tonics, that he will recover.

[NOTE.—Two weeks later twelve ounces of fluid were evacuated and the cavity was washed with a weak mercuric chloride solution, the final result being a perfect recovery.]

THE RESULTS OF A YEAR'S EXPERIENCE IN THE SURGICAL TREATMENT OF HYDROCEPHALUS IN CHILDREN.

CLINICAL LECTURE DELIVERED AT THE VICTORIA HOSPITAL FOR CHILDREN.

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GENTLEMEN,—Hydrocephalus, like ascites, is one of the medical terms which has been handed down to us from classical times. It is a symptom, and often an important symptom, of a variety of pathological conditions, and with the advance of pathological science it is gradually disappearing from the nomenclature of the scientific practitioner. Hydrocephalus as it is seen in children, with whom alone this paper deals, occurs in a simple form, including the majority of the congenital and chronic cases, and in an infective form comprising nearly all the acute and subacute cases. Hydrocephalus in its widest sense is an increased secretion of cerebro-spinal fluid, either into the ventricles of the brain alone, more rarely into the subarachnoid space alone, or, as most often happens, into both the subarachnoid space and the ventricles of the brain. The effusion is either slow and passive, or it is rapid and due to irritation. It is always serous, though it is often associated with plastic deposits.

Little or nothing is known of the pathology of the congenital form. It may be associated with other developmental errors, either of the body generally or of the cerebro-spinal system in particular. Our knowledge is not advanced, however, by saying that it is due to a dropsy of the ependyma, and we know that it is only occasionally associated with closure of the foramen of Magendie or the point of communication between the intracerebral cavities and the subarachnoid space of the spinal cord. Chronic hydrocephalus may occur in connection with rickets, and it is sometimes, but much more rarely, a manifestation of congenital syphilis. The acute forms of hydrocephalus are so often tuberculous that the correct pathological term, tubercu-

lous meningitis, has replaced in the minds of many physicians the older and more vague one of internal hydrocephalus. Papavoine,¹ working in Guersent's clinic, first drew attention to the coexistence of this form of tubercle with effusion from the cerebral meninges,—a correlation still further insisted upon by Dr. Gerhard² in America, and a few years later by Dr. P. Hennis Green³ in this country. The statement, however, is a little too general. Every case of acute hydrocephalus must not be attributed to tubercle, though the majority are undoubtedly due to this cause; for the effusion of cerebro-spinal fluid may result from any source of irritation acting upon the cerebral meninges and their extensions into the brain. Many such causes of non-tuberculous meningitis with serous effusion are now recognized, and even they are not all of an infective nature. It is met with after pneumonia in children, and more rarely after influenza, but I have seen it result from the growth of a cyst in one of the choroid plexuses, whilst subacute forms are sometimes associated with a sarcomatous growth.

Hydrocephalus, whatever its cause and however it occurs, is always a most troublesome, and is often a most dangerous, condition in children. Every surgeon to a children's hospital is constantly called upon to treat these cases, and you know that we have been no exception to the rule in the Victoria Hospital. Our wards nearly always contain one child affected with meningitis, and there is often more than one. Our physicians, disheartened by the great mortality attending these cases, are more and more ready to hand the patients over to their surgical colleagues. We get them now at an earlier period in the disease than we did before Mr. Waterhouse obtained his successful result by trephining and draining the subarachnoid space.⁴

I contented myself formerly with letting these cases alone, only trying simple surgical measures, for I was guided by Henoch's dictum that little or no good was done by operation; then I tapped the ventricles, but latterly I have trephined and drained them. I was mainly induced to resort to this method of treatment by Professor Keen's valuable paper upon the surgery of the lateral ventricles, which he has so cunningly concealed in an unindexed volume of the Transactions of the Tenth International Congress held at Berlin in 1890, and by

¹ Journ. hebdom. de Méd., Paris, 1830, p. 113.

² American Journal of the Med. Sci., Phila., 1833-34, vol. xiii. p. 313, and vol. xiv. p. 99.

³ The Lancet, 1835-36, vol. ii. p. 232.

⁴ Trans. Med. Soc. of London, 1894, vol. xvii. p. 237.

Broca's work in the same direction, as well as by the excellent work of my friend Dr. C. A. Morton, and of Dr. Parkin. I bring before you now a *résumé* of the various cases I have treated during the last year, without any selection, but it is important that, as far as possible, every case should be recorded when a new method of surgical procedure is upon its trial.

CASE I.—T. W., aged two and a half years, was admitted into the Victoria Hospital on March 1, 1894, for hydrocephalus. He had the following interesting family history: "Two of his mother's brothers have such large heads that their hats have to be made specially for them. The elder of the two brothers had 'fits' until he was seven years old. There have been eleven children in the family. The eldest, a boy, died in the Evelina Hospital from hydrocephalus at the age of twenty-one months. The second child, also a boy, died shortly after his delivery by forceps. The bones of the skull in the third child, a girl, were so imperfectly developed that they could be squeezed in like stiff brown paper. She died when she was five months old.

"The fourth and fifth children were twins; one had hydrocephalus, both had 'fits,' and both died when they were six weeks old. The sixth child is alive and healthy; he is a boy. The seventh child had a very large head. He lived six weeks, and had two hundred 'fits.' The eighth is a boy aged five, alive and well. The ninth was a boy, who died at the age of five weeks; his head was normal. The tenth is the present patient. The eleventh is nine months old, and is healthy."

T. W.'s head measured sixteen inches in circumference at birth. It now measures twenty-two inches. He is fairly intelligent, but has been very slow in cutting his teeth. He had repeated "fits" from the time he was six weeks old until the age of two years. He has attacks of spasmodic croup, and he screams at night. His head is typically hydrocephalic, and the anterior fontanelle is as large as a florin,—i.e., measures twenty-nine millimetres across,—whilst the posterior one is closed. The anterior fontanelle is not tense, and it only bulges when the child cries. The patient is strong and well nourished. He is not paralyzed, but he is restless, very fretful, and is markedly hyperæsthetic.

Four days after his admission I punctured his right lateral ventricle with a trocar and canula, drawing off half an ounce of blood-stained cerebro-spinal fluid. The operation was performed aseptically under chloroform. It was followed by a little rigidity of the left arm, which soon passed off. A collodion dressing was applied to the puncture,

and a firm bandage was put on. On March 8, four days later, the note records that "the boy seems decidedly better for the operation. He is bright, happy, and has lost much of his hyperæsthesia." He was discharged from the hospital a few days later, and was readmitted on April 25. His mother volunteered the statement that since he has been at home he has sat up much better, and has appeared to take more notice of things; latterly, however, he has again become hyperæsthetic. His head now measures twenty and seven-eighths inches in circumference. The left lateral ventricle was first punctured, but only a few drops of cerebro-spinal fluid were obtained. The trocar and canula were therefore driven into the right ventricle through the edge of the anterior fontanelle. Two ounces and a half of cerebro-spinal fluid spurted out with considerable force as soon as the trocar was removed from the canula. The fluid was quite clear; it did not contain any albumen or copper-reducing substance, but chlorides were very abundant. The temperature remained normal, and the patient was sent home two days later. He was brought to the hospital again on June 28, as he had been fretful for the last fortnight and was continually sighing. He had not been convulsed, nor had he squinted, and there was no rigidity, but he was hyperæsthetic and very irritable. His head measured twenty and three-quarters inches in circumference. A trocar and canula were put into each ventricle upon July 6; no fluid was obtained from the left side, but two ounces of blood-stained cerebro-spinal fluid came from the right ventricle. An attempt was again made to draw off fluid upon July 12, but it was unsuccessful, and the child was sent home on the 14th of July, 1894.

I show him to you to-day, May 27, 1895. His anterior fontanelle is almost closed, and his head measures only the same as it did last year. He is able to stand and can crawl readily. He appears to be in excellent health, though his mother says that he had an attack of influenza in the winter, and that he still screams at night, and sometimes has spasmodic cough, but he has no "fits." He is playful and takes much notice of things, but he cannot yet talk, though he is nearly four years old.

CASE II.—W. M., aged four, had been ailing for some weeks, and had been under medical supervision from September 26, 1893. Dr. Hawkes asked me to see him in consultation on October 5. It was obvious that he was suffering from an attack of tuberculous meningitis, and it was agreed that he should be trephined, and that his ventricles should be explored, and, if necessary, drained. On October 6 he had Cheyne-Stokes breathing. There was no marked rigidity; his pulse

was rapid and soft; his temperature was 101.6° F. Chloroform was administered, as the boy was not insensible to pain. A semicircular flap of skin and pericranium was turned down, and a crown of bone was removed with a three-quarter-inch trephine from a point just behind and a little above the right ear. The dura mater at once bulged into the opening; its vessels were much congested, but the brain beneath did not pulsate. The membranes were therefore incised, and a grooved director was passed inward through the cerebral substance in the direction of a corresponding point on the opposite side of the skull. Two ounces of clear cerebro-spinal fluid escaped. A small drainage-tube was passed into the ventricle, and the flap was replaced and stitched up in such a manner as to leave the end of the tube projecting at the wound. The condition of the patient was improved by the operation, inasmuch as his breathing became regular; his pulse distinctly increased in strength; he had much less twitching of his muscles, and he took milk and Valentine's meat-juice more readily. This improvement was maintained for ten hours after the operation; his breathing then became irregular, the twitching of his left arm and of his facial muscles recommenced, and his temperature began to rise. Typical Cheyne-Stokes breathing returned about three hours after the reappearance of the pressure-symptoms, and the patient died twenty-seven hours after he had been trephined. We were unable to obtain an autopsy, but the wound was perfectly aseptic.

CASE III.—T. H., aged four, was admitted into the Victoria Hospital on March 14, 1894. The diagnosis of his condition lay between meningitis with serous effusion and suppurative meningitis. There was no history of tubercle, but the child had suffered from otorrhœa all his life. The discharge ceased two months before the patient's admission to the hospital, and shortly afterwards he began to complain of pain in his head. The cerebellum was exposed by trephining upon the left side; clear cerebro-spinal fluid escaped, but, as no abscess could be detected, a second crown of bone was removed to allow of the exploration of the temporo-sphenoidal lobe. The boy improved a little after being put back to bed, for the coma was less absolute and the pulse became regular. The temperature, which for some days before the operation was about 101° F., sank to 97° F., and remained at normal until death. The note records that on the day following the operation the slight improvement was maintained. The food was taken better; the respirations were grouped, but they were not true Cheyne-Stokes, for they did not vary in depth. Death took place on the 23d inst., two days after the operation. The post-mortem examination

showed that the case was one of tubercular meningitis, and that the brain had not suffered from the surgeon's manipulation.

CASE IV.—H. R., aged five, admitted into the Victoria Hospital April 23, 1894, suffering from tuberculous meningitis. The child became progressively worse until April 30, when it was quite unconscious and appeared to be moribund. The boy was trephined, and half an ounce of fluid was let out from the subarachnoid space. He lived until May 5, his temperature steadily ascending the whole time. The operation did not appear to make the smallest difference in his condition, either for good or for bad.

The post-mortem notes record that he had tubercles in his lungs and caseous nodules in his bronchial glands. There was a trephine hole in his right cerebellar fossa, the skin wound being almost healed, except at the point where the drainage-tube was inserted. There was no suppuration, but there was a plastic deposit covering the base of the brain. The convolutions of the brain were flattened, and the ventricles contained three or four ounces of clear fluid.

CASE V.—A. F., aged two and a half years, admitted into the Victoria Hospital on July 19, 1894. He followed the usual course of a patient with tuberculous meningitis, and on July 26 he was squinting and was unconscious. I trephined his skull low down in the occipital region and immediately to the left of the middle line. There was little or no fluid in the subarachnoid space. The note records that on the following day the condition of the patient is much the same, but the coma is somewhat less profound. The temperature, however, fell steadily after the operation until just before death on the 31st inst., when it suddenly began to rise.

CASE VI.—A. C., aged six months. The child was strong and healthy till it was seven weeks old. It then had a rigor, was convulsed, and remained unconscious for three days. Its head has been slowly enlarging ever since. The child was anæsthetized on April 23, and I drew off five ounces of blood-stained cerebro-spinal fluid from its left lateral ventricle by puncturing the brain through the anterior fontanelle. The pulse improved in volume and in strength directly the fluid was removed. The head was then strapped and tightly bandaged to keep up pressure. The condition of the child was said to be improved upon the following day, for the ward note says, "He does not vomit so often, and he takes his food better. There is less twitching of the arms and legs." There was more rigidity on May 5, and the circumference of the head had increased from eighteen and three-quarters inches on April 22 to nineteen inches. There is still some

sickness. The child was restless, and there was more bulging of the fontanelles and sutures. The head was retracted and opisthotonus was becoming marked. I therefore trephined the skull over the descending horn of the right lateral ventricle, and removed five ounces of clear cerebro-spinal fluid by pushing a trocar and canula through the dura mater. Drainage of the ventricle was carried out by means of a dozen horse-hairs bound together and passed along the track of the canula into the ventricle. The child had a little rigidity of the left side after the fluid had been drawn off, but it passed away before he was removed from the operating-table.

The ward note states that the child was distinctly improved by the operation, but on May 8 the symptoms of cerebral pressure again became pronounced and the temperature began to rise. I dressed the wound, and found that the horse-hair drain had nearly disappeared beneath the skin-flap, and that no cerebro-spinal fluid was escaping. I therefore readjusted the bundle of horse-hairs and satisfied myself that it was effective. The ward note says, "May 10, the child has been better since the wound was dressed on the 8th inst., and there has been so free a discharge of clear cerebro-spinal fluid that a daily dressing is required. The temperature is lower, there is less sickness, and the child takes food better. The wound has healed, except at the place where the drain lies, and the sutures have therefore been removed. May 12. There is still good drainage. The temperature is lower, and the general condition is distinctly better. There is less retraction of the head, and the opisthotonus is less marked. The child cries out less, and does not resent being disturbed so much."

The previous symptoms of intracranial pressure recurred upon the evening of the 12th, and the temperature rose to 103.4° F. No fluid had passed along the horse-hair drain since the previous evening. I therefore opened up the subarachnoid space about an inch and a half below the occipital protuberance and as near the middle line as it was safe to go. A drainage-tube was passed into the subarachnoid space, and was brought out through a hole in the centre of the flap. There was a free flow of cerebro-spinal fluid, and the temperature dropped from 104.6° F. to 98° F. It remained low for two days, whilst there was a free discharge of fluid, but on the 16th it rose to 101° F. The tube was explored with a probe, and by exercising a little gentle pressure upon the skull a free discharge of fluid was again obtained. The temperature immediately fell, and remained low until it rose again to 103.4° F. just before the child's death on the 20th.

The autopsy in this case showed that there was neither tubercle,

syphilis, nor rickets. I examined the cerebro-spinal fluid carefully for bacilli, but I could find none. I injected some of it intraperitoneally into a guinea-pig, but there was no reaction. The cause of the condition is therefore obscure. The brain was found to be thin and expanded; the subarachnoid space contained about two ounces of clear cerebro-spinal fluid, the ventricles a little more, and more upon the left side than upon the right. The piece of drainage-tube had passed forward and downward beneath the cerebellum until it lay upon the floor of the fourth ventricle in such a manner as to leave a track along the inferior surface of the left lobe of the cerebellum. Its point lay exactly opposite the foramen of Magendie, which was large enough to admit a No. 4 catheter. The arachnoid at the base of the brain was thickened, but it did not present any tuberculous nodules. It was distended into a sac containing clear cerebro-spinal fluid, and lying on the under surface and at the posterior edge of the cerebellar hemispheres.

The results arrived at in these cases are not very encouraging, but they are, I think, sufficiently hopeful to lead us to persevere in operating, at any rate in some cases of hydrocephalus. I hold very strongly, with Professor Jacobi, that the motto of every surgeon should be *non nocere*. No harm has been done in any of the cases, and it was manifest to us, who were watching the cases, that in each instance the life of the child was prolonged, sometimes only for a few hours, sometimes for a few days, and sometimes even for a longer period. I say this advisedly, well knowing how rapid and how startling are the changes which take place in the more acute cases of serous meningitis with effusion. The removing of the fluid, by relieving the intracranial pressure, led in each case to an improvement in the pulse and in the respiration, whilst the fall of temperature was so great and so marked in several instances that I am beginning to wonder whether the temperature can be looked upon as an index of the amount of intracranial pressure. It is, at any rate, a point which I shall bear in mind in future cases, for the few observations I have made are insufficient to settle so important a question.

It is obvious that in tuberculous cases the same good results are not obtained by letting out the fluid as occur after laparotomy for the relief of tuberculous peritonitis. This is perhaps due to the fact that the cerebro-spinal fluid is a better culture medium than the peritoneal fluid. It is in these cases, however, and in those associated with the growth of other micro-organisms that we should hope to obtain the

best results by trephining and draining; for in these cases the onset is acute, the effusion is not very great, and the brain substance is comparatively little thinned, whilst it is only in the later stages that it is paralyzed by pressure. It is necessary, however, in these cases that there should be no active centre of disease to produce and disseminate bacilli; for so long as such a central focus exists, so long must local peripheral resistance be useless. Neither can we hope to obtain any satisfactory results so long as the base of the brain is covered with a thick layer of inflammatory exudation. The post-mortem appearances in the chronic and congenital cases warn us that any operative measures in the direction of draining away the cerebro-spinal fluid must be adopted early, and must of necessity be useless in congenital cases. The cerebral substance is so thin and is so greatly disorganized in cases of long-standing intraventricular effusion that it is as hopeless to expect a good result in them as it would be to look for recovery of function after draining a congenital cystic kidney.

There remain, then, only a small minority of cases of hydrocephalus in which drainage is likely to be of service. Such cases are those in which the effusion comes on slowly, as in Case I., without any assignable cause; and in these cases it would appear as if simple puncture were sometimes sufficient to effect a cure. Secondly, those cases in which the effusion is due to the action of micro-organisms which have no chemotactic properties,—that is to say, have no power of causing plastic deposits by leading to an increased exudation of leucocytes. We are as yet unable to diagnose such cases, but, inasmuch as they certainly occur, we are justified in operating in those cases of meningitis with effusion which have not already progressed too far. We may save life; we shall certainly not destroy it, for the operation *per se* is not dangerous.

Gynaecology and Obstetrics.

PELVIC HÆMATOCELE.

CLINICAL LECTURE DELIVERED AT THE LONDON HOSPITAL.

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late President of the Obstetrical Society of London; Examiner in
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College of Surgeons of England.

GENTLEMEN,—In a lecture published in the INTERNATIONAL CLINICS (Vol. III., Series IV.), I described the causes, symptoms, and treatment of bleeding into the peritoneum so great as to threaten life. But there may be bleeding into the belly which does not threaten life by its amount. In the majority of these cases attention is drawn to the bleeding because it causes pain, and the blood when it has clotted forms a lump. These lumps are the subject of this lecture.

There is a different kind of bleeding into the belly, in which the blood which flows is menstrual blood, prevented from escaping from the womb by atresia of the passage. This blood is treachery; it does not clot; it is dead; therefore saprophytes, if they get to it, find it a fertile soil for their multiplication. It does not form a lump, but often causes fatal peritonitis. These cases are different from those in which living blood flows out and clots. They are like them in that blood is effused, but in no other way. I do not speak of them in this lecture.

Hæmatocele more than a Symptom.—It is sometimes said that pelvic hæmatocele is a symptom, not a disease. It is more than a symptom: it is a morbid change which produces symptoms and signs of its own. It is true that it is not a primary morbid change, but an effect secondary to other changes, and that the primary changes may be different in different cases. But a hemorrhage within the pelvis is none the less a distinct and important morbid change.

Nomenclature.—Lumps made of clotted blood have been called by different names. Let us be clear what these names mean. Internal bleeding from the vessels of the female genitals may be in one of three

places: 1, into the peritoneum; 2, into the cellular tissue, under the peritoneum, but above the deep pelvic fascia; 3, into the cellular tissue below the deep pelvic fascia. When swellings made of clotted blood in the pelvis above the deep pelvic fascia were first recognized clinically, they were called *hæmatoceles*. Those who first invented this term applied it to bleeding either (1) above or (2) below the peritoneum. The clinical differences between these two kinds of hæmatocele, the (1) intraperitoneal and the (2) extraperitoneal, have only lately been pointed out. Effusions of blood below the deep pelvic fascia extend down into the vulva, and have long been known as pelvic *hæmatomata*. It has been proposed to apply the term *hæmatocele* to hemorrhage into the peritoneum, and call hemorrhage into the connective tissue *hæmatoma*; but I think we may as well describe two kinds of hæmatocele and one of hæmatoma, as one of hæmatocele and two of hæmatoma. Therefore I keep to the old nomenclature.

Intraperitoneal hæmatocele means a lump formed of clotted blood in the pelvic part of the peritoneal cavity.

Causes of Intraperitoneal Hæmatocele: 1. *Tubal Pregnancy*.—The most common cause is *tubal pregnancy*. A tubal gestation seldom first manifests its presence by a great internal hemorrhage. Generally there is first a small bleeding, which is stopped by clotting of the blood. This clotted blood forms a lump, an intraperitoneal hæmatocele. If by the bleeding enough damage has been done to the chorionic villi to kill the fœtus, there will be no more bleeding. The lump of clotted blood will then be the disease, and will gradually be absorbed. If the pregnancy has not been stopped there will be another bleeding, and then another and another, until the fœtus either dies or gets out of the Fallopian tube, unless the process is interrupted by the death of the mother.

2. *Tubal Mole*.—Rupture of the tube, leading to recurrent hemorrhage into the peritoneum, is caused by a living, growing tubal pregnancy. But the ovum may die while it is still in the tube, before the tube has burst. It is believed by many, but the fact is not yet fully established, that the contractions of the tube may move the ovum towards the abdominal end of the tube, opening up the end of the tube just as the os uteri is opened in an ordinary abortion, and tending to expel the ovum into the peritoneal cavity, just as in a uterine abortion the ovum is expelled into the vagina. It is certain that changes may take place in a tubal ovum like those which, occurring in a uterine ovum, convert it into what is called a fleshy or carneous mole. The presence of the dead ovum irritates the tube, just as an aborting

ovum or a retained piece of chorion irritates the uterus and makes it bleed. If the fimbriated end of the tube be open there may be a steady drip of blood from it into the peritoneum. This blood will clot and form a lump. The clot may lie loose in the peritoneum, so that it can be easily scooped up or washed away; or there may be inflammation of the peritoneum around it, varying from a little roughness of the serous membrane, making the clot adherent, to extensive adhesions bounding a cavity in which the clot lies. In the latter case the clot may become surrounded by a wall of coagulated fibrin like that which when it occurs in the uterus is called a "fibrinous polypus." In this state it may remain unchanged for many months.¹

3. *Disease of the Ovary.*—Intraperitoneal hemorrhage may come from the ovary. In the lecture above referred to (INTERNATIONAL CLINICS, Vol. III., Fourth Series) I have described the conditions of the ovary which cause hemorrhage. There is physiological bleeding into the Graafian follicles, with ovulation. Such bleeding is not enough to give trouble. It has been supposed² that the physiological congestion may, by accidental causes acting shortly before the time of ovulation, be so increased that the bursting of a Graafian follicle will cause bleeding enough to form a hæmatocele. This is theory; there is no evidence that a healthy ovary ever bleeds enough to form a hæmatocele. There is hemorrhage into many follicles of the ovaries occurring in the course of the acute infective diseases. This forms a minor incident in the course of these diseases. I know no evidence that such bleeding ever makes its way into the peritoneum. There is hemorrhage into ovarian cysts and rupture of them, and there is interstitial hemorrhage into the ovary, leading to its rupture. These two last-named conditions, we know from post-mortem evidence, may cause fatal hemorrhage. It is possible that they may sometimes be the source of bleeding which stops before the patient's life is in danger. If so, the blood would clot, form a lump, and finally be absorbed, unless the disease of the ovary which caused bleeding should lead to further trouble. But this is only a supposition. We know nothing as to the symptoms which these conditions cause when they do not cause bleeding; and therefore in hemorrhage from such conditions we cannot diagnose the cause of the bleeding except by opening the belly, which in slight cases there is no reason to do.

4. *Reflux from Uterus, or Bleeding from Inflamed or Congested Tubes.*—"Metrorrhagic hæmatocele" is a term applied by Bernutz and

¹ See Taylor, Medical Press and Circular, July 18, 1894.

² See Bernutz and Goupil, N. S. S. translation, vol. i p 181.

Goupil to cases in which they found bleeding into the peritoneum along with bleeding from the uterus, as, for instance, from abortion. They supposed that some of the blood escaped by the vagina and some ran along the Fallopian tubes into the peritoneum. Bernutz and Goupil added so much to our knowledge that any opinion of theirs is worth careful consideration. But I think it very doubtful whether, except as the result of mechanical obstruction to its outflow through the cervical canal, regurgitation of blood through the tubes ever takes place, for the following reasons: 1. The uterine opening of the tubes only admits a bristle, and it is very unlikely that blood should flow this way when the cervical canal is open. 2. Cases have been observed in which a Fallopian tube was abnormally patent, but regurgitation of blood through these open tubes had not taken place. 3. It is only in recent years that Fallopian tubes containing blood have been carefully examined, and almost every Fallopian tube containing blood and having its abdominal end unclosed, that has been well examined, has been found gravid. This makes it probable that cases described without thorough examination as abortion with metrorrhagic hæmatocele were probably tubal pregnancies in which the uterine decidua was being discharged. 4. Hemorrhage into the Fallopian tube has been observed when the uterine end of the tube was closed, and therefore the blood must have come from the tube itself.

I therefore am not satisfied that there is such a condition as metrorrhagic hæmatocele, meaning by that hemorrhage from the uterus escaping by the Fallopian tube into the peritoneum. I think that cases appearing to be such are either tubal gestations or cases of hemorrhage from the tube itself. An inflamed Fallopian tube may bleed, but hemorrhage into the tube is less common than inflammation, and we do not know what kinds of inflammation of the tube are apt to cause bleeding.¹

5. *Acute Diseases.*—In some *blood diseases*, of which a tendency to hemorrhage is a symptom, the Fallopian tubes may bleed. Bleeding into the peritoneum has been found in fatal cases of measles, purpura, scurvy, acute atrophy of liver, phosphorus-poisoning, and yellow fever. The symptoms of this kind of intraperitoneal bleeding are less striking than the other symptoms of the disease to which the hemorrhage is due; therefore it is only found out after death. The bleeding is seldom enough to endanger life. If it kills, it does so by causing

¹ For a series of carefully-examined specimens of hemorrhage into the Fallopian tube, most of them with intraperitoneal hæmatocele, see Cullingworth, *St. Thomas's Hospital Reports*.

fatal peritonitis. If the patient survive, the hemorrhage and the disease which caused it, the clotted blood, would form a tumor to which the term intraperitoneal hæmatocele would be applicable.

6. *Perimetritis*.—In post-mortem examinations of patients the subjects of chronic perimetritis, it is common to find blood in some of the spaces bounded by adhesions. This blood comes from rupture of the thin-walled vessels in recent adhesions. This intraperitoneal bleeding is an incident of perimetritis, and does not materially modify its symptoms or course. Such bleeding is never great, for the vessels opened are not large, and the bleeding is limited by the pressure of the adhesions bounding the space into which the blood is poured out. In such cases the symptoms of pelvic inflammation are more marked than those of internal bleeding. An intraperitoneal bleeding of this kind is not found out till the swelling is opened, either during life or after death.

In brief, small intraperitoneal hæmatoceles are generally due to tubal pregnancy. Apart from this, they are either accidents of other diseases more important than the hæmatocele, or they are secondary to rare morbid conditions which cannot be diagnosed.

Symptoms and Signs.—The small lumps of clot in the pelvic perineum which we call hæmatoceles cause pain. The pain comes on suddenly, with faintness and pallor, but it does not produce enough blanching to strike an observer who did not know what the patient looked like before the bleeding, nor is the faintness commonly enough to make the patient send for a doctor. The patient lies down and expects the pain to pass off; she calls in the doctor when she finds the pain does not subside. The pain is in the lower belly, and, like most pelvic pains due to bilateral lesions, is worse on the left side.

A doctor who should examine the patient immediately after the onset of symptoms would find no physical signs. A lump is felt when the blood has had time to clot, not before. The blood first lies about the Fallopian tube whence it came, and then trickles down into Douglas's pouch. Hence the lump of clot is behind the uterus. If there is enough of it to fill the posterior half of the pelvis, the bulk of the clot is in the middle. If less than this, there is more of the lump on one side than in the middle line.

When the clot is big, it pushes the uterus a little forward, not much, because the uterus affects the position of the clot more than the clot that of the uterus. The clot in Douglas's pouch presses on the rectum, and this causes a good deal of rectal tenesmus and pain in defecation, and if the lump is big some catarrh of the rectal mucous

membrane is produced. If there should be adhesions above the pelvis, the bleeding may displace the uterus very much, pushing it forward against the pubes, compressing the urethra, and causing retention of urine. Such displacement as this only happens when the blood is effused under pressure, and therefore is rare from intraperitoneal hæmatocele. The presence of a hæmatocele, together with the pelvic congestion which precedes it, may irritate the bladder and cause frequency of and slight pain in micturition.

Diagnosis.—A hæmatocele forms a fixed lump behind the uterus. The physical signs are the same as those of a lump formed by inflammation of the peritoneum around the ovary and tube. The lump made of blood-clot is distinguished from an inflammatory lump by the way in which the illness came on. This you generally have to learn from the patient or her friends; and as their account is not always clear, you often have to be content with a conjectural diagnosis. Instead of shivering and febrile symptoms, and pain afterwards developing, the blood tumor comes on with sudden pain, faintness, and pallor, but without fever. If the bleeding be a result of tubal gestation, it may have been preceded by amenorrhœa with the subjective symptoms of pregnancy. The conjectural diagnosis from the history is confirmed by the clinical course observed. In the course of a few days or weeks the lump gets smaller, firmer, and irregular on the surface instead of convex; the uterus becomes more movable, and at last the lump is no longer felt.

It is difficult—sometimes impossible—to distinguish a small effusion of blood around the end of a Fallopian tube from an effusion into the tube (hæmatosalpinx). In the present state of our knowledge the diagnosis is not very important, as the same principles of treatment apply in either case.

Prognosis.—The prognosis in a case of intraperitoneal hæmatocele is uncertain. It depends upon the cause of the bleeding. If this comes from a growing tubal gestation, there will be more bleeding. If it comes from a tube containing a mole, this may suppurate.¹ If from an inflamed tube, this may, by keeping up pelvic inflammation, make the patient a chronic invalid. If from a diseased ovary, this may bleed again, or it may become inflamed. An intraperitoneal hæmatocele should therefore make you suspect dangerous disease of the tube or ovary. On the other hand, many cases of intraperitoneal hæmatocele end in perfect recovery by gradual disappearance of the

¹ See a case by Remfrey, *Obst. Trans.*, vol. xxxvi, p. 261.

lump without bad symptoms. Our clinical knowledge of the conditions which cause intraperitoneal bleeding is still so recent that (with the exception of some cases of extra-uterine gestation) we cannot yet diagnose them with accuracy, nor do we know the relative frequency of the different possible endings of such cases.

Treatment of Intraperitoneal Hæmatocele.—There are two methods of treatment,—1, expectant, leaving the case to nature; 2, operative, removing the blood and the diseased ovary or tube whence it came. An operation on the peritoneum involves so much suffering, mental and physical, and so many sacrifices on the part of the patient, to say nothing of the immediate and remote dangers, that it is far better for the patient to get well without it, if possible. Therefore, so long as there is nothing more than a small lump in the pelvis, presumed to consist of blood-clot, let recovery go on without interference.

If recovery is not going on well, symptoms will show themselves. These may be of two kinds,—(a) those of renewed bleeding; (b) those of inflammation. In either case the advent of the fresh symptoms shows that the cause of the bleeding was not a condition which was temporary and is past, but one still active. If so, the best practice is to anticipate further trouble and remove the diseased part. We do not know, in the conditions we are dealing with, how far we may trust the power of nature. It is true that if there be a growing tubal gestation the fresh hemorrhage may kill the embryo, but not its mother; true, also, that an ovary which is inflamed and infiltrated with blood may become shut off by adhesions, and so rendered harmless. But we cannot be certain of these favorable endings. The risk of an operation done early, before the parts have been altered so that their recognition and removal are difficult, is slight. If there is within the belly a condition capable of causing bleeding or inflammation, the risk of ill consequences from early operation is less than the risk of leaving the disease. If left, an operation may, after all, be necessary, and it may be that the parts will then be in a condition unfavorable to the satisfactory performance of the operation.

In short, do not operate merely because there is a small clot of blood in the peritoneal cavity; but if there is reason to think that the condition which caused the bleeding is still present, open the belly without delay.

Expectant Treatment.—This consists in keeping the patient in bed, and on liquid diet, until it is clear that the blood is being absorbed, and that therefore further hemorrhage is not to be feared. Order this regimen in order, as far as possible, to slow the circulation, to diminish

pressure in the blood-vessels, and to lessen bowel irritation. There is no drug that will hasten the absorption of blood. If the bowels are confined, a laxative will be good. If the patient is in much pain, she may need a dose of morphia. If the case goes on well, the lump that you feel by the vagina will get harder and smaller, its convexity will become changed into irregular concavities, and the local symptoms will cease. As soon as it is clear that the case is taking this course, let the patient get up and take her ordinary diet.

Extraperitoneal Hæmatocele.—This means bleeding into the cellular tissue beneath the peritoneum, but above the deep pelvic fascia. Its commonest cause is the rupture of a pregnant tube at that part of it which is not covered with peritoneum, but is in contact with the cellular tissue between the folds of peritoneum. It sometimes happens after operations on the broad ligament, if a vessel underneath the peritoneum is injured without a breach of that membrane. Mr. Lawson Tait thinks it common from sudden arrest of hemorrhage from the uterus; but I am sure it is not common, and I doubt whether it is produced by this cause. I know of no other causes for it. I have published¹ a case in which it was thought due to the hemorrhagic diathesis; but the effusion was very old, and it may have been from extra-uterine gestation, the frequency of which was not known at that time.

Bleeding in this situation takes place under pressure. The blood is confined above by the peritoneum, below by the pelvic fascia and the levator ani. It is poured out on one side. When there is enough to force its way across to the other side, it also makes its way back by the side of the rectum to the pelvic wall. The shape of the blood-effusion comes from its limits. Mr. Lawson Tait has happily compared it to a jelly-fish, rounded above, concave below. The effusion seldom rises above the pelvic brim, but it may do so, and then it forms a rounded, well-defined tumor, over which, before the blood has clotted, fluctuation may be felt. Below the mass slopes off downward and outward, feeling as if it merged into the pelvic wall. By the rectum it will be felt as a half-ring, surrounding the rectum, and fixed to the pelvic wall on each side of it. If the effusion be great, this half-ring will considerably narrow the rectum, flattening its lumen from before backward. This half-ring is characteristic of effusion into the cellular tissue. It is not, and cannot be, produced by effusion into the peritoneum. It is met with, also, in pelvic cellulitis, when this extends

¹ Obstetrical Journal of Great Britain, vol. v. p. 455.

backward, but when it is the result of inflammation it does not narrow the rectum so much as when it is the result of hemorrhage.

The diagnosis between intra- and extraperitoneal hæmatocele is important, because the clinical differences are great. Each is more often the result of extra-uterine pregnancy than of anything else. When the bleeding is into the peritoneal cavity, it is probable that further trouble will follow: hemorrhage, if there be tubal pregnancy; either hemorrhage or inflammation, if there be any of the causes of intraperitoneal bleeding. Uneventful absorption of the blood is far from certain. If further trouble follows, it will follow quickly. Such cases, therefore, always require careful watching, and often they need prompt operation.

When the bleeding is under the peritoneum, there is no immediate danger. Death will not be caused by the hemorrhage. Most cases end in subsidence of the symptoms and absorption of the blood. Such danger as there is is remote. The risks are those incident to the development of an extra-uterine fœtus, of secondary rupture into the peritoneum, of suppuration of the sac, and other rarer accidents of ectopic pregnancy.

Treatment of Extraperitoneal Hæmatocele.—The treatment of this kind of blood-effusion is always expectant. As there is no immediate danger, there is no need for immediate operation. If danger should arise later, there will be ample warning, so it may be waited for.

While the patient is suffering from the shock due to the loss of blood and the pain caused by the pressure of the effused blood in the tissues, keep her in bed. If the pain be so severe as to prevent sleep, relieve the pain by morphia. If patient be costive, give laxatives. Watch the course of the case by examining the lump at intervals of about ten days, to see whether it is getting bigger or smaller. If the gestation has been arrested, the blood will be gradually absorbed. As soon as you find the lump gets smaller and more uneven, you may with confidence let the patient get up, and tell her that further treatment is unnecessary. If the gestation has not been arrested, and the fœtus is developing underneath the pelvic peritoneum, then, although the symptoms will get better, the swelling will not get smaller, but larger, and the case ceases to be one of simple hæmatocele.

PELVIC PERITONITIS AND ENDOMETRITIS.

CLINICAL LECTURE DELIVERED AT THE POLYCLINIC HOSPITAL.

BY J. M. BALDY, M.D.,

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GENTLEMEN,—We present for your consideration to-day two cases. The first is a woman, twenty-five years of age, who has been married five years, and during this time she has borne two children. Two years after the birth of the second child, three years ago, she began to complain of pelvic trouble. Up to this time, both during her single as well as her married life, she had been perfectly healthy. This trouble first showed itself by severe pain, excessive vaginal discharges, irregular and profuse menstruation. You will note especially that up to the time this trouble began she had been perfectly healthy.

As I have already told you, she has borne two children in the five years she has been married, and after the birth of each child she seems to have regained her usual health at once. Now, two years after the birth of the second child, without any subsequent pregnancy or miscarriage, she develops pelvic trouble. Simultaneously with the development of this trouble she had gonorrhœa; at least that is our conclusion from what she states. In the beginning she complained of pain and itching about the vulva; she also showed signs of bladder trouble. She had no children for two years, and no miscarriages. She admits having had profuse leucorrhœa at this time, but gives no cause for it. We can only assume that this trouble was gonorrhœal. In speaking of endometritis last week, I told you there were practically two causes of pelvic inflammation, either septic infection following gestation or gonorrhœa. The history of this patient is clear enough for us to say that she had a gonorrhœa, and not a puerperal septicæmia, as the beginning of her trouble. This disease spread first to the uterine cavity, then to the Fallopian tubes, and has finally invaded the peritoneal cavity, causing a local peritonitis.

An examination discloses, as you will be allowed to verify in a few moments, a tender mass on the left side of the uterus: the mass is clearly a tumor of the Fallopian tube and ovary. The uterus is ante-flexed. You can feel the outlines of the womb very readily. On the right side the same condition apparently exists. The masses referred to are immovable, are evidently adherent, and unless you are very careful you will think the whole thing is one mass. The distinction between the appendages and the uterus, however, is sufficiently marked for you not to be mistaken. There is no fluctuation at any point to indicate the presence of pus, nor do I think there is in this case any present.

The second case is that of a woman who has been married ten years and who has had one child. That child was born nine years ago,—that is, during the first year of married life. Since that time this woman has been a sufferer from the symptoms of which she now complains. She says that she was perfectly healthy before her marriage, and from that date until her child was born. After her confinement she was an unusual length of time in bed, it being about eight or nine weeks before she could be out. During this period she suffered from a swollen and painful abdomen and constipation, which she was told was due to inflammation of the bowels. She arose from bed an invalid, and has remained one ever since. It is perfectly clear that this woman had at that time post-*puerperal* *septicæmia*: there is no question as to the correctness of this. As has been stated, she was healthy until her marriage, and from then until the birth of her child. We can only assume that this woman did not have a prior *gonorrhœa*, and the cause of the *septicæmia* was surely due to septic germs. She comes to us now suffering from pain in the pelvic region, irregular and profuse menstruation, *leucorrhœa*, painful coition, constipation, and all the reflex nervous symptoms which accompany chronic pelvic inflammation. Her uterus is ante-flexed, with a lacerated cervix and perineum. There are adherent tender masses on both sides of the uterus, which are unquestionably tubes and ovaries.

The result in these two patients, although originating in different causes, is identically the same. The infection was different, but the process of extension and the results are identical,—first, *endometritis*, followed quickly by *salpingitis*, and, finally, *peritonitis*. Both these women are sterile, are suffering much pain, have lost flesh, and have all the characteristic symptoms of pelvic disease. What is to be done for them?

Take these patients now as they appear before us to-day with
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Fallopian tubes and ovaries attacked by inflammation and their functions destroyed. We have the disease in its chronic form, and shall be forced to treat it as such. Of this I shall speak presently. But what of the treatment in its acute form, which should have been applied, but which was only too evidently neglected, which neglect is responsible for the present deplorable condition of both these women? If either or both of them had come to us when the disease was in its acute condition,—that is, prior to the infection of the Fallopian tubes, for instance,—we would have treated them by curetting the uterus, sterilizing and draining its cavity. If these patients come to us after the disease has passed into the Fallopian tubes, we cannot treat them with much success. If such patients as these are to be cured at all, *nature* is going to cure them, with a little judicious aid on our part. We cannot treat the Fallopian tubes by applications of the curette as we can treat the uterus. When the disease has passed into the tube it is practically beyond local treatment, and we must then turn to the general treatment of inflammations for aid.

Under these circumstances the first thing to do with such patients is to put them to bed, or if they are already in bed, they must be kept there. The second and important step is to prevent any further infection of the Fallopian tubes. There is a certain amount of infection already, but it may be that *nature* will be enabled to relieve this if no more is allowed to enter. Even although the symptoms point to the fact that the disease has possibly spread beyond the tubes to the ovaries, still your duty is as just indicated. The only reliable method of accomplishing this is to curette the uterus and get rid of the infection which is there present. If this has been done thoroughly, the question resolves itself into a battle of *nature* against disease, and there is nothing more which it is in your power to do for the patient in the acute stage, excepting to apply the general treatment for inflammations. Neither of these patients had any treatment at the time of their original illness. The first patient was given some whiskey and quinine, but no attention was paid to the uterine trouble. This, I am sorry to admit, is almost the routine practice of a very large number of practitioners of medicine.

These patients come to us at this late day, after years of suffering and treatment by a number of physicians, as unsexed women, so that your aim is simply to relieve their suffering, the question of sterility not entering into your consideration. Of course, the treatment and the results obtained in these cases depend very much upon the means and life of your patient. Poor women cannot be treated as success-

fully as rich women. Take a rich woman with trouble of this kind, one who is able to make an invalid of herself,—that is, does not have to work, can go to bed and rest when she wants to, and can lie down when pain comes. A woman like this, with an affection of this kind, may live the whole course of her life with little discomfort, if there be no pus present. She does not expose herself to the conditions which are likely to induce repeated attacks of inflammation in these parts. Take a poor woman, on the other hand, one who follows the wash-tub, one who has to work for her living; almost every day of that woman's life is putting her in a position that will induce an attack of pelvic inflammation as a complication of the diseased appendages. In other words, the woman is at all times threatened with an attack of inflammation: the difference in the two classes of women is that the one necessarily and continually exposes herself to the risk of inducing attacks and gets them, and the other does not so expose herself and probably does not get them. I do not pretend to say that this always holds true, but the proportion of poor women who suffer from repeated attacks of pelvic peritonitis after having had the original attack is enormous as compared to the rich. When the poor woman is threatened with an attack of peritonitis she cannot afford to go to bed, and thus abort the attack, as it would oftentimes mean the poor-house for herself and her children if she gave up her work. In such a patient with the disease having lasted a number of years and one whose Fallopian tubes and ovaries have been destroyed the only thing to do is to operate and remove the disease. This is the more important as the woman is having repeated attacks of pelvic peritonitis. If an operation is necessary the one which must be done is known as abdominal section. You can by this means reach the Fallopian tubes and ovaries, inspect the whole field of the disease, see how much damage has been done, and deal with the case on its merits. If you find the Fallopian tubes and the ovaries adherent as is probably the case here, break up the adhesions, thus freeing the diseased organs. If the mouths of the Fallopian tubes are not closed and their walls are not badly infiltrated and degenerated, the appendages need not necessarily be removed. This may be true of one side only, or of both sides, as the case may be. Should you not remove the appendages on both sides, of course you will not bring on the menopause. This is a desideratum wherever obtainable. The inflammation may have run its course, leaving a certain amount of damage behind, which is represented by the adhesions, and these, of course, must be thoroughly broken up. This you may be able to do, and at the same time leave

the pelvic organs in such position that they will not readhere, and, if so, nature will easily complete the cure. To prevent readhesion, the ovaries, tubes, and uterus should be displaced from their former position, so as to prevent raw surfaces from coming in contact with each other. This can be accomplished usually by stitching the uterus to the abdominal wall. There is much to be said both for and against such treatment. Oftentimes, where such organs have been left, the patient has continued to suffer, and has finally been forced for a second time to place her life in danger, in order to have the offending organ or organs removed. Such a practice adopted as a routine would be an exhibition of exceeding bad judgment. The patient and her whole condition and surrounding must settle the question in each individual case. If, on the other hand, you find the opening into the Fallopian tubes closed, you can by this procedure give no benefit whatever. Such a patient is hopelessly sterile. She could never conceive again, and it is best to end her suffering by removing the diseased organ.

After operations for the removal of both ovaries, patients do not regain their health at once for several reasons. Every such woman has the menopause brought on by the operation, and will necessarily suffer all the symptoms of this condition until such time as the function is fully established. Every woman who has the menopause brought on by an operation has it brought on more rapidly and abruptly than it would have come if she had waited until the regular time. The flashes of heat come with more energy than natural, and the stages of depression are more intense than they would otherwise have been. The whole process is apt to last longer, and so long as it lasts the woman is by no means a well woman. The point is, the longer after the operation the better the result.

The longer a woman goes without an operation when her pelvic organs have once become irreparably damaged the more that woman runs down into a poor condition of health. There comes a time where a patient's health has been so shattered that she has passed the point where it is possible for her ever to recover it again entirely. Many of these cases are long-standing sufferers. There is not one of you gentlemen who can understand the amount of pain these women have borne for years, neither could you have stood it for this length of time without your health being entirely shattered. The longer any woman has to stand the pain and repeated attacks of pelvic peritonitis from which these two women have been suffering, the more likelihood is there that she has passed the point where she will ever again recover her health, operation or no operation. Of course, they

should be given all the benefit that can be derived from medicinal treatment; but this should not be carried on year in and year out, with the patient going from bad to worse all the time. There is a limit to which this should be carried, and that limit is counted by months, not years. We do not always expect to cure these patients thoroughly, but to relieve them of probably one-half or three-fourths of their suffering: the balance may remain as long as they live. They will oftentimes still have aches and pains, which they would not have had if the disease had been removed two or three years before. Many of these patients are coming to the clinics to-day who are uncured by their operations or are only relatively cured. The blame for this cannot be ascribed to the operator, but to themselves, or more probably to their former medical attendants. The gentlemen who first treat these patients very often do not treat them properly, and are consequently responsible for all the subsequent trouble. Until the general profession awaken to the importance of treating promptly and rationally gonorrhœa and post-puerperal septicæmia, they must not complain if the surgeon does not always cure their patients by an operation, especially when they have probably wasted years in doing nothing, until the patient's health is so shattered as to render it impossible for it to recover itself, even after the disease is removed.

The two patients before you have exhausted all methods of medicinal treatment, and you will in a few days have the opportunity of seeing them on the operating-table and judging for yourselves as to their pelvic condition and the technique of the operations. Should patients fall into your hands at an early period of their disease, the proper course for you is first to give them a thorough and fair trial of hot-water vaginal douches, rest in bed, absolute sexual rest, applications to the vaginal vault of iodine, ichthyol, or acetanilide, together with the judicious use of tampons and purgatives. You will almost always, in the chronic cases, cure them by these means of the attack of acute inflammation from which they are suffering when you first see them. If after this they remain well, even if the appendages are enlarged and adherent, there is no need of further action. If, on the other hand, as is mostly the case, they constantly suffer pain from which you cannot keep them relieved, or have recurring attacks of pelvic peritonitis, it is your duty to see that the disease is removed, and not waste years of useless time.

There are two subjects which I have not mentioned,—electricity and massage. I have but a few words to say in regard to them. There is no cure to be gotten from either of them in any case. There is no

result that you can get from electricity or massage that you cannot get from rest in bed. Electricity, to be properly applied, requires a very extensive plant, and also requires a certain amount of skill, and a very considerable amount of knowledge of the dangers, etc. With regard to massage, much harm may be done with this. The man who is not a skilful manipulator and does not thoroughly understand the pathological conditions of the pelvis is going to do infinitely more harm than good. You can get just as good results by the other methods of treatment which I have mentioned; and when you have done this you have done all you can do, and must trust to nature to do the rest, as the amount of aid you can give is very little. I am speaking of *cure*, not *relief*. In speaking on this subject, you must make a clear distinction in your minds between these two conditions. Relief you can give by treatment; cure is seldom obtained, excepting through operation.

OVARIAN CYST; TUBERCULOSIS OF THE VULVA; RELAXATION OF THE PELVIC FLOOR; HYS- TERIA.

CLINICAL LECTURE DELIVERED AT THE JEFFERSON HOSPITAL.

BY E. E. MONTGOMERY, M.D.,

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Jefferson Medical College.

OVARIAN CYST.

GENTLEMEN,—This patient is one who underwent operation three weeks ago to-day for the removal of an ovarian cyst. You remember her sutures were removed two weeks since. I bring her again before you to show the result of the operation and her general appearance. You see the line of union, how complete it is. You will remember that this patient had a very large ovarian cyst which weighed about fifty pounds; the solid material of the cyst alone weighed twenty-three and one-half pounds. She was very much depressed by the operation, suffered from quite profound shock, as there were extensive adhesions, the operation requiring nearly an hour for its completion. It was necessary during its progress to give strychnine, grain one-fifth, hypodermically. She is now about ready to leave the hospital. The removal of large ovarian cysts is frequently attended with considerable danger. In a cyst as large as the one this woman had, where it fills the entire abdominal cavity and makes pressure against the diaphragm and upon large vessels, interfering with the circulation, producing venous stasis, the vessels become very much distended, lose their muscular tone, and, after the operation is performed, become reservoirs in which the blood from the rest of the body drains, and is no longer driven forward. The patient consequently bleeds to death into her own blood-vessels. For this reason it has been recognized that, in large ovarian cysts, it is preferable to subject the patient to a preliminary tapping in order to take off this pressure and enable the patient

to recover somewhat before the operation is done. This patient was subjected to tapping, and nearly two gallons of fluid withdrawn. The quantity in the cyst was small, for the reason that the cyst was a multilocular one, and it was rather dangerous pushing the trocar from one cyst to another within the abdominal cavity. As the trocar was withdrawn a large quantity of clear fluid escaped from the peritoneal cavity; this was an ascites which had resulted from the pressure of the tumor upon the vessels, crippling the action of the eliminating organs,—the kidneys,—causing a condition of anasarca to develop. This tapping decreased the pressure, enabled the patient to rest comfortably in the recumbent position, and at the time of the operation, two days after the preliminary tapping, her limbs were not at all swollen. Her convalescence has been a very satisfactory one.

TUBERCULOSIS OF THE VULVA.

This patient is thirty years of age, is married, and has a negative family history. Her childhood was healthy. Puberty occurred at twelve years of age; she was regular; the periods, lasting six days, were painless. She was married nine years ago, and has had four children; the first labor was instrumental, the subsequent labors were normal. She had one miscarriage five years ago. The first two children are dead; both were delicate from birth. The eldest died at eleven months, the second at six months, from marasmus.

Her present trouble began about four years ago. She now suffers from burning at micturition. The labia majora are enlarged, particularly the right. The bowels are regular, she suffers from frequent micturition, the appetite is good, and she sleeps well. As the limbs are separated, you see the swollen labia. A swelling of this kind might lead you to suspect a variety of conditions. Both are large, but the right is the more swollen and prominent of the two. You might suspect it to be due to œdema, as a result of an accumulation of fluid in the labium from some dropsical condition, or in the sac within the labium, known as a hydrocele. A prolongation of the peritoneum upon the round ligament may be subject to inflammation, and cause a distention, forming a large accumulation, just as we would have in the scrotum of the male. The swelling might be suspected to arise from an inflammation in the gland of Bartholin. This gland is situated in the posterior part of the labium, and when inflamed gives rise to a distention of the entire labia; or it might be due to traumatism. These various possibilities would occur to you in attempting to account for such a condition, but it is unwise to accept superficial appearances. It is important to examine

carefully the entire structure to ascertain the cause. As we separate the labia we find within the vulva an explanation. The mucous membrane on the right side is excavated, presenting a furrow a quarter of an inch deep and a third of an inch wide, extending from the posterior surface of the vagina forward to the anterior wall, extending upward in the centre the distance of three-fourths of an inch. The borders of this excavated tract are firm and resisting. Anteriorly, we notice some tubercular projections from the mucous membrane. The labium below is swollen and oedematous. The induration extends forward over the anterior wall of the vagina and about the urethra. What explanation shall we give for such a manifestation, and what will be our diagnosis? Looking at this, at first we might suppose that we had to deal with a specific disease. The extent of the ulceration and the character of the discharge would lead you to suspect such a possibility. But when we come to consider the history of the case, we must remember this patient has been sick over two years, the diseased surface has been gradually extending, it has not been attended with marked pain and distress, and there is no indication of extensive involvement of the tissues beyond the point at which it originated, so we certainly are not justified in this diagnosis. The disease in simple chancroid would have run its course before two years, or there would have been more marked destruction of tissue than we find here. In chancroids there is not usually induration of the margin of ulceration, nor do we find indurated portions of tissue at a distance from it. There has been no history of glandular involvement. Had it been syphilis, the local manifestation would have been succeeded by the secondary and tertiary stages before this time. We have in this patient the absence of any history of subsequent development beyond the local manifestation, so that, with this negative history, we must exclude the possibility of this having been chancroid or chancre. If it is not specific, is it epithelioma? In an epithelioma we would not expect to find the disease existing for four years without much more marked destruction than is here present. Beyond the involvement of the space at the junction of the vulva and vagina on the right side we do not find any marked extension. An epithelioma of that duration would have resulted in an extensive breaking down of the ulcerated surface, from which there would be profuse and offensive discharge. There would, without question, have been before this time, also, glandular involvement. Then, again, we do not usually find the disease occurring so early in life. Epithelioma and malignant disease are found in later life. I would not have you understand that they cannot occur, for I

have seen women twenty years of age in the Philadelphia Hospital dying of epithelioma; but when the disease occurs in the young it progresses rapidly, much more so, indeed, in my experience, than in those of a more mature age. Setting aside, then, the probability of this being epithelioma or specific disease, we reach the conclusion that it must be that rare form of disease of the genital organs known as tuberculosis. I do not mean that tuberculosis occurs so rarely in the genital organs, but it is rare, or at least has been described as of rare occurrence in the vulva and vagina. It may possibly be due to the fact that it is only of late years that its true character has been recognized and such conditions differentiated from the other diseases we have just described. The first examination of this patient, taken together with the history, led me to believe we had to deal with tuberculosis. This suspicion was confirmed by the microscopical examination of the specimen, when it was pronounced tubercular granuloma. In some of these cases we may be able to find, in the early stage of the disease, the bacilli; later, however, they may disappear, while the effects of the disease still remain. It is difficult to exactly determine in such a case how the disease has originated. What has led to the local infection? In inquiring of this patient we find there has been no history in her family of any tubercular disease. On the other hand, a number of her husband's family have died of phthisis. Her husband is not in very good health, and complains very much of his back. Of course, it is impossible, without an examination of the husband, to determine whether there has been any possibility of her infection from him direct. It has been demonstrated that tuberculous disease may be carried to a female from the male through the semen. This disease began some four years ago; it may possibly have been implanted upon suitable soil in this individual through contact with infection from the hands of a nurse, or from dust in a room in which the infection was present. This woman, as you see, is a colored woman. She probably lives in a portion of the city in which the houses are crowded, a number of persons occupying the same room, some of whom may suffer from tubercular disease, and, as is usually the case, very careless about the possibility of bacilli being transmitted from one person to another. From whatever source, however, the infection has occurred, we find this patient to be suffering from a form of tuberculosis. This condition is similar to that in which tuberculosis occurs upon the face or other parts of the body, and is known as lupus. We find a number of papules or tuberculous masses forming; these break down, ulcerate, discharge, and then, in the place of the original mass, there is a cic-

tricial depression, sometimes producing extensive disfigurement. Tubercular disease is a rare condition affecting the external genitals. At least it has only recently been described. Cases have been demonstrated, showing involvement by tubercular disease, of the vagina, cervix, cavity of the uterus, tubes, and the peritoneum. Many cases in which abdominal operations are necessary in young women who have not suffered from the possibility of specific infection, or the condition is not the result of sepsis, may be explained by the occurrence of tuberculosis. A case comes to my mind of a patient operated on nearly two years ago,—a young woman who had had an attack of pneumonia. She was suffering from pelvic trouble, a great deal of pain and distress, obliging her to keep quiet, and was unable to move about. On examination it was found there was a mass of exudation or induration upon each side of the uterus, involving the ovaries and tubes. The absence of any history of specific infection led me to believe that this patient was suffering from tubercular disease of these organs. Notwithstanding there was a possibility of onset of trouble in the lungs, I felt it was wise to subject her to operation for the removal of this condition, inasmuch as it rendered her unable to be about and take necessary physical exercise. The operation was done, and the origin of the condition demonstrated by the appearance of the tissues removed. The patient recovered from the operation, returned home, and, while she was very much relieved of her distress, she died a year later from tubercular disease of the lungs. Not unfrequently in women in whom there have been pus collections, which have been attributed to the result of either septic or specific infection, the subsequent development of tubercular disease has rendered it probable that the latter was the source of the original infection. Some three years ago I operated upon a young woman, twenty years of age, in whom there was a pus collection in the pelvis, with a history of the trouble having developed after an examination by the use of the uterine sound. The patient was very much emaciated, and presented a large collection of pus in the pelvis, more particularly upon the right side. The abdomen was opened, and it was found that this collection was situated in the right broad ligament, the latter forming a large sac. It was so spread out that we were unable to remove the sac complete. We had to content ourselves with emptying out the cavity, irrigation, and thorough curetting. The cavity was drained and the patient recovered, with a fistulous opening. As this was a source of much annoyance, and a mass could still be recognized by palpation, the abdomen was opened. In doing so a number of whitish masses were noticed which studded the intestines

and omentum at different points; one of these was situated directly beneath the wound. The fistulous tract was cut out, the right ovary removed, the abdomen irrigated, and the wound closed. Unfortunately, one of these masses, situated immediately beneath the wound, caused its infection, and the patient, after the wound had closed, presented a pulpy appearance of the cicatrix, which subsequently opened in three places, and examination of the openings disclosed their tubercular character. The wound was again reopened, the abdominal wall thoroughly curetted, the diseased tissue scraped away, the tubercular disease was, as far as possible, removed from the peritoneal cavity, adhesions broken up, and in so doing the weakened intestine torn open in one place. The latter was sutured, the abdominal cavity was packed with iodoform gauze, and the wound thus kept open. The patient has recovered good health, and the wound closed, excepting a small fistulous opening. Her life was unquestionably prolonged by these two subsequent operations. At present there is no indication of tubercular disease.

Those of you who have seen a large number of operations have possibly seen cases in which the peritoneal cavity was studded with tubercular nodules. I have seen cases in which it presented the appearance of the skin of a small-pox patient, the entire peritoneum being studded with masses the size of small-pox pustules all over both parietal and visceral surfaces; yet, in such cases, the opening of the cavity, its irrigation and drainage, have resulted in apparent atrophy of these masses and the cure of the disease. I remember a patient whom I was called to see who was supposed to be suffering from an ovarian tumor. The abdomen contained a large quantity of fluid, the superficial abdominal walls were thin, the peritoneum was apparently half an inch thick, presenting a stiff, board-like feel. Percussion disclosed the fact that the intestines were in close proximity and that the fluid was free in the cavity. A diagnosis of tubercular peritonitis was made, and in eliciting the history it was found that her husband had died less than two years before from phthisis. On opening the abdomen it was found studded with tubercular masses, and the peritoneum presented a thickness varying from one-fourth to half an inch. Some two gallons of fluid were emptied out, the cavity irrigated with hot water, a drainage-tube inserted, and the wound closed. The patient recovered, and two years later was in excellent health.

Years ago Spencer Wells reported the history of a patient in whom he had diagnosed ovarian cyst, owing to the intestines being bound down by peritonitis. After opening the abdomen it was found studded

with tubercular masses; the cavity was emptied and drained; the patient recovered and subsequently enjoyed years of good health; so that in these tubercular diseases, whether situated in the peritoneal cavity or outside in the genital tract, whether we are enabled to remove or correct the local condition, the probability of the recovery of the patient is excellent. In this patient we have been endeavoring to treat this disease by painting the tissues with a solution of iodoform in colodion. If this does not prove satisfactory we will take her into the hospital, give the parts a thorough curetting, cut away the thickened tissues, and pack with iodoform and keep clean, and thus endeavor to bring about cicatrization. There has been as yet no indication of any tubercular disease of the lungs.

RELAXATION OF THE PELVIC FLOOR.

The next patient is thirty-three years of age; the family history is negative; puberty occurred at ten. She is an Italian woman, and it is important to keep in mind the fact that natives of hot climates are more likely to mature early than women in colder regions. Menstruation is regular, lasts four days, and is painless; she was married at twelve years of age; has had four children and no miscarriages. Her last labor occurred four years ago; the labors have been normal. She has been suffering since last June, when her menstruation became scanty, painful, and continued only from two to four hours. She suffers from pain in the back, radiating downward and forward in the groin, and has a sensation of weight in the lower part of the abdomen, also coronal headache. She menstruated the last time on the fourth of this month; it was painful and of short duration. Bowels are regular, the bladder irritable, and she suffers from a leucorrhœal discharge. I have not as yet examined her, but bring her before you to ascertain the history and determine what is best to be done. As we inspect the vulva we see the orifice is somewhat relaxed; the anterior wall of the vagina sags down, and this is probably increased by any straining effort. There is also sagging of the posterior wall, the entire vulvar orifice is lower than it should be, and the anus is situated at a level lower than that of the vulva. What does this indicate? Simply that in one of her confinements there has been a tearing off of the levator ani muscle; consequently the anus is no longer held up by it. As a result of this there is a dropping down of the tissues supported by this muscle,—in other words, a relaxation of the pelvic floor. The vulva stands open; there is a rolling out of the anterior and posterior walls of the vagina. Introducing the finger into the vagina I would

expect to find the uterus possibly somewhat enlarged. It is apparently displaced. There is some enlargement of the organ, and the cervix presents a number of small, bead-like projections, indicating the presence of an inflammatory condition which is the cause of obliteration of the ducts of the glands of Naboth and the formation of small cysts. Introducing the speculum, I can see these small projections around the margin of the os, so small as not to be seen from the benches. The cervix stands open, and there is a slight eversion of its mucons membrane from a fissure which has not completely closed. These cases were formerly operated on for lacerated cervix, but we now realize that in small fissures of the cervix an operation is unjustifiable. An operation would result in decreasing the size of the opening and in defective drainage. The discharge from the uterus being retained, the efforts on the part of the organ to empty its contents might result in regurgitation into the tubes and the development of an inflammatory condition there of such a character as to necessitate operative interference. In such cases patients are much relieved by operations looking towards the re-establishment of uterine drainage. The treatment for this patient would be a somewhat complicated procedure. The diseased condition of the uterus would necessitate dilatation and curettement of that organ, and it should be packed with iodoform gauze to insure subsequent drainage. Any plan of treatment, however, which does not consider the sagging down of the pelvic floor would be only palliative in character. Patients suffering from a sensation of weight, dragging in the pelvis, coronal headache, general discomfort, constipation of the bowels, frequently distress of the bladder, will very often be found, upon examination, to have had a loss of the support of the pelvic floor, and an operation which consists in the restoration of these parts to their normal condition relieves the patient of the greater part of the distress. The operations done for ordinary laceration of extensive character are of little service. The procedure here must look towards the restoration of the functions of the levator ani muscle. The latter is done by denuding a triangular space upon the posterior surface of the vagina, with the base of the triangle at the outlet. The sutures are then introduced by beginning above, and carrying the suture well down in the denuded surface and backward upon the opposite side, so that the line described by the suture, with that of the denudation, will form a double triangle, the bases of which lie in contact. These sutures introduced in this way result, when they are tightened, in bringing the posterior surface of the vagina upward with each suture, so that the posterior wall is held in contact with the anterior, and the ends of the levator

ani muscles have greater influence upon the pelvic floor. It has an additional advantage over the old operations in that the pain from the sutures is greatly decreased. None of these sutures are situated outside of the vagina, consequently the tender tissues of the peritoneum are not affected.

The next patient is twenty-two years of age, married, and a house-keeper. Her family history is good; she enjoyed good health during childhood, and puberty occurred at fourteen. The periods were irregular, lasting six to seven days, and attended with sharp pain and bearing down in abdomen and pelvis. The pain begins two to six days before each period, and continues three or four days afterwards, sometimes obliging her to remain in bed when it is most severe. She has been married four years and has two children, the first three years ago,—an instrumental delivery,—when she remained in bed only four days subsequent to delivery. The last occurred two years ago; it was also a difficult labor and instrumental. She was confined to bed two weeks. She had a miscarriage a year ago after three months' gestation. The history of this patient would lead us to suspect that the uterus was enlarged and in a state of chronic inflammation. As we examine we find in her also there is a relaxation of the pelvic floor, so that when the labia are separated we are enabled to look an inch and a half into the vaginal canal. In this patient the treatment marked out for the preceding case is equally indicated.

HYSTERIA.

I had hoped to have brought before you a patient whom you saw in this room two weeks ago to-day suffering from manifestations of hysteria. You remember she was reported to have had these attacks twice daily since January of the present year, the attacks occurring at regular hours. When before you she was beating the mattress upon which she lay continuously with the left hand, kicking with the right foot, and rolling her head from side to side, apparently utterly unconscious of all about her. These attacks were said to last from an hour to an hour and a half, and were apparently uncontrollable by any medication to which she had been subjected. Such conditions always cause much anxiety and distress to the members of the family. The patient usually receives a great deal of attention, possibly is held by a number of persons. The attacks are discussed before her, and her morbid vanity is in this manner aggravated. The attacks were said to come on at half-past one each day. By suggestion, however, we succeeded in inducing her to have an attack, two weeks ago, before one

o'clock, so that you could see its occurrence. After she was sent to the ward these attacks were brought on earlier by merely turning the clock forward, showing that they were under the control of her will. After admission to the ward, when she went into an attack in the evening, she was placed in a cold pack and ice placed about her. This resulted in the abbreviation of the attack from one hour and a half to five minutes. When she began the second seizure, she recovered upon the mere preparation for the ice pack. From the third seizure she also recovered before she was put in the pack, but the pack was administered, and she was informed that it would be used with every seizure. The result was that she promised to have no more, and, although she has been with us for two weeks, she has had no symptoms of anything of the kind. The patient was wearing a Mackintosh pessary, which, if anything, aggravated the nervous manifestations,—kept her mind constantly dwelling upon the fact that some diseased condition was present. As we found an endometritis, we placed her under an anæsthetic, carefully dilated, curetted, and packed the uterus, and the patient left us in her right mind, and in a much more healthy nervous condition.

REPEATED CÆSAREAN SECTION.

CLINICAL LECTURE DELIVERED IN THE NEW YORK POLYCLINIC.

BY HENRY C. COE, M.D.,

Professor of Gynæcology at the New York Polyclinic; Gynæcologist to the New York Cancer Hospital; Obstetric Surgeon to the Maternity Hospital, etc.

GENTLEMEN,—The patient upon whom I propose to operate this morning has such an interesting history that I shall review it briefly while she is being etherized. This is the second Cæsarean section and the fourth abdominal operation which I have performed upon her. She is a Russian, twenty-two years of age and unmarried. She entered the New York Maternity Hospital January 26, 1891, being near the full term of her pregnancy. She was four feet six inches in height, with a well-marked kyphoscoliosis and lateral obliquity of the pelvis. (Fig. 1.) The measurements then taken were: crests, $10\frac{1}{2}$; spines, 10; external conjugate, 6; true conjugate, $3\frac{1}{2}$; left external oblique, $8\frac{3}{8}$; right external oblique, $7\frac{1}{2}$ inches. There was marked obliquity on the right side and apparent ankylosis of the sacro-iliac joint. The symphysis was unusually high and the pelvic arch narrow. The cervix was high up and could be reached with difficulty. The child appeared to be mature.

FIG. 1.



After consultation with my colleagues, we unanimously decided that Cæsarean section offered the only good prospects for a live child.

After waiting a week for labor to begin, it was decided to operate before that process commenced. This I did on January 12, 1891.

There was nothing of especial interest about the operation. The child weighed six and a half pounds, was healthy, and was living when last heard from, several months after the operation. The mother's convalescence was afebrile, but she was so unruly as to require constant restraint. In her struggles she burst open the lower angle of the wound on the fourth or fifth day, so that a coil of small intestine protruded. She was chloroformed, the gut replaced, and sutures introduced. After this she had no further trouble, and was discharged at the end of five or six weeks. The scar was extensive, and the abdomen was unusually protuberant, on account of the patient's deformity, and, as only a single row of wire sutures had been used, I feared the development of hernia, and cautioned her about wearing her abdominal bandage. This she failed to do, and continued at her work without it. She did not report to me for over a year, when she returned with a large ventral hernia, and complained of severe abdominal pain. I sent her to the hospital and operated for the cure of the hernia.

I found extensive omental and intestinal adhesions, which were thoroughly separated. The pelvic organs were normal. The old scar was excised, and the wound was carefully closed with four rows of sutures. A considerable portion of the omentum was removed. Her convalescence was afebrile, and she was again discharged cured, with the same caution as before as to the necessity of wearing a bandage. Another year passed, when she returned again, in the fall of 1893, with a small ventral hernia and some abdominal pain. She was again admitted to the hospital, and another operation was done to cure the hernia. The parietal adhesions of the omentum and intestine were separated and tied. Unfortunately, the uterus was not examined at that time. The patient spoke such imperfect German that no clear history could be obtained from her at any time. The peritoneum, fascia, and skin were sutured more carefully than before. The patient was kept in bed for about a month, although her convalescence was nearly normal. She was discharged with the usual admonitions, which I did not expect her to heed. I hoped that I would never see her again, as she had become a regular nuisance.

The following spring (1894) she came to my office, looking very badly and complaining of loss of appetite and emaciation. The possibility of pregnancy did not occur to me, as she had so indignantly received the advice to avoid that danger in the future. I examined her lungs, and thought that I detected suspicious signs at one apex. The fact that she had not menstruated since her last operation might have been explained by the incipient pulmonary trouble. I gave her

some medicine and told her to come back in a few weeks, which she did, looking worse than before. She had always had a prominent abdomen, but now she called my attention to the fact that it was larger than before. She had considerable abdominal pain, and was troubled with constipation and tympanites. I made quite a superficial examination, and suggested that she should re-enter the hospital for examination. She indignantly denied having had sexual intercourse. She had been in the hospital but a few days when we discovered that she was in the sixth month of pregnancy. Ballottement, foetal heart-sounds, and other signs were noticed. There were absolutely no mammary changes, and the patient insisted up to the last that she had not been exposed, and that she did not feel life.

She has now been in the hospital for over two months, and, so far as we can judge from the imperfect data obtained, she is within two weeks of full term. Her general health has improved greatly, and the theory of tuberculous trouble has been abandoned. The question at once arose, What was the best thing to do for the patient? I sought counsel and obtained various opinions. The induction of premature labor, of course, suggested itself, but I hesitated to resort to this, (1) because it offered little prospect of life for the child; (2) because I suspected that there might be intestinal and omental adhesions to the uterus, which would seriously complicate labor; (3) because I felt that it was time to "cut off the source of supply," by ligating the tubes, in order to prevent a repetition of the pregnancy.

My friend, Dr. Edgar, who has had considerable experience in symphyseotomy, suggested that the elective operation should be performed at the eighth month, as this would offer a good chance of a living child. This I decided to reject, for the reason that this case seemed to belong to the class to which symphyseotomy is *not* regarded as applicable,—that is, there is ankylosis of the sacro-iliac joints. Again, I shrank from performing version, or possibly using high forceps, because of the previous cicatrix in the uterine wall and the undoubted presence of adhesions. After balancing the different opinions, I decided to perform a second Cæsarean section, at the same time breaking up adhesions, and, by careful suturing, to provide against the recurrence of hernia, to which the patient is so prone. I may say here that, though the abdominal wall is unusually thin, the former scar is firm, and there is now no evidence of hernia.

The patient has been prepared for this operation with more than ordinary care. Attention has been paid to the pulmonary and thoracic viscera, and she is now in excellent condition. I have just satisfied

myself by examination in the etherizing-room that the foetal heart is strong. I have directed that an enema of whiskey and hot saline solution should be given to her before she is brought into the operating-room.

I begin my incision at a point just above the old cicatrix and a little to one side, in order to avoid adherent loops of intestine. Introducing my finger, I encounter slight omental adhesions, which are easily broken down. It is now a simple matter to enlarge the incision to the necessary length with angular scissors. Lifting the uterus out of the abdomen, my assistant at once prevents the escape of the intestines by covering the wound with hot towels. Acting on the suggestion of Dr. Jarman, I shall protect the abdominal cavity against the entrance of fluid by a large piece of rubber-dam tissue, stretched around the lower segment of the uterus in exactly the same manner as a dentist uses it in filling a tooth. The cervix is temporarily constricted by a piece of rubber tubing, which is held by an assistant on my right. The scar of the first operation is seen in the median line of the uterus as a fine white line. I make my incision into the anterior wall of the organ a little to one side of the old cicatrix, and, introducing a finger, rapidly enlarge the wound with angular scissors. I find the placenta directly in the line of the incision, which has been the case in my two former Cæsarean sections. The child is deeply asphyxiated, and I shall therefore ask my friend, Dr. Grandin, who has had great experience in such matters, to take charge of it at once, while I proceed to remove the placenta and suture the uterine wound.

The amount of hemorrhage, you see, is insignificant. I shall now suture the uterine wound in the usual manner, introducing eight or ten deep sutures which include the entire thickness of the wall except the mucous membrane. This line of sutures is covered in by a second series of Lembert sutures of fine silk, fifteen or twenty in all. The rubber tubing can now be removed, as there is no danger of hemorrhage. You must have been struck by the promptness with which the uterus contracted as soon as it was emptied. (Fig. 2.) Before introducing the sutures I passed two fingers through the cervix, in order to satisfy myself that there was ample provision for drainage. I have never found that this objection to the operation before labor (the danger of insufficient drainage) held good in practice, nor have I been obliged to tampon the uterus with gauze in order to promote contraction after emptying it. In order to prevent future impregnation, I shall ligate the Fallopian tubes close to the uterus with stout catgut. The ovaries, as you see, are quite normal. You observe that

the abdominal cavity is perfectly dry : not a drop of blood or amniotic fluid has escaped into it. I shall now suture the abdominal wound. This is a somewhat tedious procedure, but it pays to take time. The peritoneum is closed with a row of catgut sutures, the fascia with catgut in the same manner, and the skin with silkworm gut. I have previously passed six or eight silkworm-gut sutures through the entire thickness of the wound. There certainly ought not to be any recurrence of the hernia. The operation has been delayed, principally on account of the deliberate suturing of the wound, but the patient has not been under ether for more than an hour. As you see, she has lost very little blood, and her pulse has not been much accelerated.

[The child was revived, and throve from the outset. (Fig. 3.) It was transferred to an asylum at the end of three weeks. The patient did well until the fourth day, when her temperature rose to 102° F., her pulse became rapid, and she showed evidence of septic infection. The lochial discharge was perfectly normal. The abdominal wound was carefully examined, and induration was detected at the lower angle. Subsequently the lower portion of the wound sloughed open, doubtless due to bad catgut, thus exposing the uterus. Fortunately, the organ had become adherent to the anterior abdominal wall, so that the abscess was completely shut off. The entire anterior surface of the organ was covered with a dirty, grayish slough, but the uterine sutures held firmly, and at no time was there any evidence of infection of the endometrium. After being seriously ill for over a week, the patient, who had always been able to take nourishment and stimulants freely, began to convalesce, the slough separated, and the wound healed rapidly by granulation. All of the superficial and several of the deep uterine sutures were removed. The patient was able to be about in the fifth week, and was discharged two weeks later. When examined six months after the operation, the abdominal cicatrix was firm. The uterus was small and movable, and the patient was able to perform hard manual labor. She menstruated about a month after the operation, and has continued to do so regularly ever since. Her general health is excellent, and, with the exception of an occasional pain in the abdomen, she is in better health than at any time since the first operation.

In fourteen repeated Cæsarean sections in the United States, three deaths resulted. One woman died after her third operation. In the twenty-six sections performed upon thirteen women by sixteen different surgeons, the maternal mortality was 11.4 per cent., while the foetal mortality was about thirty-seven per cent.]

PYOSALPINGITIS WITH INTRA-UTERINE PREGNANCY; OVARITIS; PAROVARIAN CYST.

CLINICAL LECTURE DELIVERED AT THE HOWARD HOSPITAL.

BY ROBERT H. HAMILL, M.D.,

Obstetrician to the Philadelphia and Maternity Hospitals; Gynæcologist to the Howard Hospital.

GENTLEMEN,—The patient now before you is a woman thirty-two years of age, who has been married about eight or ten years, and has had two children. Some of you may remember having seen her on a previous occasion, about eighteen months ago, at which time we operated on her for a right tubal pregnancy, since which time she has been in excellent health. She now comes to us with a history very similar to the previous one,—namely, that last month her menses did not appear, and they have not as yet appeared this month, the time for her period having passed. Yesterday she states that she was seized with a very sharp pain in her abdomen, the spot of greatest intensity being over the left ovarian region. So great was this pain that it caused her to double up and fall on the floor. Upon examining her I find a well-defined mass to the left of her uterus, and the cervix is much softer than normal, so that from the presence of this mass and the sharp pain complained of I am of the opinion that we shall find another tubal pregnancy. However, the pain upon examination is not as severe as is usually found in extra-uterine pregnancy. Upon further examination I also note that the uterus is considerably enlarged, and the breasts are somewhat larger than normal, and contain cholesterine. I think we shall find an intra-uterine pregnancy; but this, however, will not deter me from operating, as it is quite possible that the intra-uterine pregnancy, if it exists, will still go on uninterruptedly. While the patient is being etherized, I want to say a few words as to the manner in which she has been prepared for the operation. Upon admission to the hospital she was given a full bath, placed in bed, put on liquid diet, and

internally was given $\frac{1}{20}$ of a grain of strychnia until $\frac{3}{20}$ had been taken. Last night a full dose of magnesia sulphate was given, which was followed this morning by a rectal enema. The abdominal surface was thoroughly scrubbed with a sterile brush and tincture of green soap, followed by a similar scrubbing with alcohol, then rubbed thoroughly with benzine, and bathed with a one-thousandth solution of bichloride of mercury. A pledget of gauze thoroughly soaked in a one-thousandth solution of bichloride was then applied, and fastened with a sterile bandage. This procedure was repeated this morning, and the dressing has been left undisturbed until now. She has had nothing to eat this morning with the exception of a small quantity of beef tea. As to the method of sterilization of the instruments and dressings, the former, as you can see, are placed in a copper box with different compartments. These instruments have been boiling for over half an hour. It is well to add a small quantity of bicarbonate of soda to the water. This box, as you will observe, is of a convenient size, and can be readily conveyed in a telescope. The silk which I use for ligatures in the abdominal wound has been boiled thoroughly, and in addition sterilized for one hour at three different times. All the towels and dressings have been subjected to thorough sterilization. Our patient is now ready, and I would call your attention to the old wound, of which there is still a slight scar. This time I shall make my incision somewhat to the left of this scar. Introducing my fingers into the wound, I find the uterus considerably enlarged and softer than normal, and the walls are somewhat thinner than in the non-gravid condition. I feel positive that she has an intra-uterine pregnancy. I find the left tube very much enlarged and quite adherent to the adjacent organs. But the adhesions are not at all dense, and are easily broken up, so that I shall soon have the tube and ovary delivered. I presume you can all see now that I was in error in my diagnosis, and that we have a tube containing pus instead of an extra-uterine pregnancy. I suspect that the woman has had a gonorrhœa since her last operation, for at that time the tube was in a healthy condition. I shall remove this tube, even at the risk of interrupting the pregnancy. In closing the abdominal wound I shall unite the peritoneum by an uninterrupted suture of catgut, then the fascia with an uninterrupted suture of silk, and an intracutaneous stitch for the skin. In removing this stitch all that is necessary is to pull on one end, and we have a practically invisible scar. In dressing the wound I have dusted it with acetanilide, and covered it with sterile gauze and cotton; I now put on the adhesive strips and the abdominal binder. There is one point to which I should

like to call your attention here, and that is the removing of the patient from the operating-table to the bed, which should always be done very carefully. I speak of this because at one time I had an accident occur through the rough handling of the patient, where the ligature slipped off from the stump and a secondary operation was necessary. One cannot be too careful about the removal of the patient. Our patient is now placed in bed, and nothing is given to her until twenty-four hours have elapsed, when nourishment is commenced by giving her a drachm of milk and a drachm of lime-water, the milk being increased a drachm each hour until an ounce is reached, and this is given every two hours. Her bowels will not be moved until thirty-six hours have elapsed, when a movement will be effected by an enema of hot water and soap. On the eighth or ninth day I shall remove the suture.

[NOTE.—On the twenty-first day after the operation the woman left the hospital entirely well, her convalescence having been uninterrupted, the temperature at no time going above 99° F. She has had no symptom whatever of an abortion from the operation, and I confidently expect that she will go on to full term and be delivered.

It is now six months since the operation, and the woman has been delivered of a full-term child, healthy in every respect. The labor was normal and easy.]

The next patient, a woman, aged twenty-eight years, began menstruating at the age of fourteen. Her menses have been regular ever since, but have always been accompanied with great pain, and these pains have increased very much since an attack of peritonitis some years ago. Since that time she has had great pain over both ovarian regions, increasing at each menstrual period, and it has frequently been so bad that she has been compelled to remain in bed for days. She is unable to walk any distance, and has not been able to attend to her duties as a teacher for any length of time. Upon careful calculation we find that this woman, out of the fourteen years of her menstrual life, has spent seven of them in bed. She has been treated by palliative measures for a number of years without any alleviation whatever. Upon examining her I find both tubes and ovaries exceedingly sensitive, and her uterus an infantile one. The pain after my first examination was so great that she was compelled to remain in bed for two days. I have already treated this woman by means of counter-irritation, with blisters over both ovaries, and hot vaginal douches daily, with rest in bed, and supportive treatment; but this has all been of no avail, and she now comes to us demanding operative interference. She has been under my observation for one year, and I feel

that, in justice to the patient, we must at least make an exploratory incision. Upon doing this I find that both ovaries are exceedingly small, and are cirrhotic, the tubes are considerably congested and thickened, and I shall remove both of them.

[NOTE.—Three weeks after the operation her convalescence has been uneventful, and her general condition is very much improved. I have every reason to believe that she will be very much benefited as a result of the operation.

Now, several months later, she reports to me that she is in most excellent health. She is able to ride horseback any distance she chooses, walks eight or ten miles without any effort whatever, and since the operation has not known what it was to have a pain. When she first came to me she was in a very anæmic condition, had a slight cough, anorexia, and sleeplessness; whereas now she has a most excellent appetite, goes to bed and sleeps the entire night, and is in every way a different-looking woman.]

The next patient presents the following history: She is a married woman, thirty-eight years of age, and has had one child, seventeen years ago, this being the only time she has been pregnant. She states she has always had good health, but says that six or eight months ago she began to feel "below par." Her menses became irregular, both as to appearance and quantity, and gradually she became much troubled with a cough, palpitation, and difficulty in walking. As you can see now, she wears a very anxious expression, is somewhat emaciated, and she tells me that she cannot sleep well, has anorexia, her digestion is very poor, and she is obstinately constipated, her bowels never moving without either some cathartic or an enema. Examination reveals a greatly distended abdomen, with striæ all over. Percussion reveals flatness all over the abdomen, and there is a considerable difference in the note upon changing the position. Fluctuation is readily detected, and I find, upon a vaginal examination, that the entire pelvic cavity is filled with a fluctuating mass, which apparently originates to the left of the uterus, I have advised the removal of the cyst, and I will now proceed to do the operation. You can notice, upon opening the peritoneum, the projection of the cyst, and upon introducing my trocar I find a large quantity of fluid, which, being measured, amounts to twenty-eight pints, not counting the quantity which escaped by the side of the trocar. I find the cyst located between the left ovary and tube and the free edge of the broad ligament. It is entirely free from adhesions, and occupies the entire abdominal cavity, extending from the diaphragm to the pubes. It contained, as you will notice, a clear,

almost colorless fluid. You will observe the small stump which remains after the removal of the cyst.

[The convalescence was uneventful.]

It is unusual to find cysts of this variety so large. Schatz collected twenty-four cases from literature, and later thirty-eight cases have been reported. Winckel reports a case from which he obtained twenty-nine pints. In four hundred and fifty autopsies he met with twenty-five cysts of the broad ligament, and the majority of them were very small.

MULTIPLE INTRALIGAMENTOUS MYOMATA.

CLINICAL LECTURE DELIVERED AT THE KENTUCKY SCHOOL OF MEDICINE HOSPITAL.

BY WILLIAM H. WATHEN, M.D., LL. D.,

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GENTLEMEN,—The patient upon whom I have just operated, removing these myomatous tumors and the uterus, is aged forty years. The history of the case is about as follows: She has no children; she is large and apparently in good health; she has had a tumor connected with the uterus for many years, which was diagnosed three years ago as a myoma by Professor W. L. Rodman and Dr. Dunn, who referred the case to me. I did not see her until a few days ago. She then told me that the tumor had been causing her trouble for five or six years; that it was the source of serious inconvenience from pressure in the pelvis, upon the bladder, and upon the rectum, and she wanted it removed.

I found just above the symphysis pubis, a little to the right, a solid, movable tumor about the size of a turkey's egg; deeper and to the left I detected a solid growth that was nearly immovable. Introducing my finger into the vagina, pressing it up around the uterus, I found that this organ was fixed, the fixation being almost entirely upon the left side, which was filled with a hard tumor. I diagnosed an intraligamentous myoma,—i.e., an intraligamentous myoma upon the left side, with a pedunculated myoma arising from the upper part of the tumor or the fundus of the uterus. She was prepared for the operation; her bowels being freely moved for several days; frequent baths with warm water and soap; shaving the abdomen and vulva, using ether to remove oily substances from the skin; then applying for twenty-four hours a sterilized towel wrung out of a one

to one-thousand bichloride solution. Her vagina was thoroughly cleansed with soap and hot water, then irrigated with a bichloride of mercury solution (1 to 1000), and tamponned with iodoform gauze, which was removed just before the operation, and another vaginal douche of bichloride (1 to 1000) given.

When the abdomen was opened you heard me remark that we had encountered an intraligamentous tumor of the left side, which would be difficult to remove. I deliberated whether I should attempt to remove the tumor or remove the uterine appendages, as this in some cases is beneficial in uterine myomata. But I remembered that in the experience of the best operators the removal of the tubes and ovaries has not usually resulted favorably in the treatment of intraligamentous or retroperitoneal myomata. I also discovered that the ovaries and tubes, particularly upon the left side, were so embedded in the myomatous growth that I could not tell where they were, and therefore could not remove them. I was able to ligate the broad ligament on the right side down nearly to the internal os; this was done by carrying the ligature near the tumor, deep down, bringing it out and ligating the infundibulo-pelvic portion of the broad ligament. Then with forceps on the broad ligament, near the uterus, I divided the broad ligament between the forceps and the ligature down nearly to the internal os. Upon the left side the broad ligament could not be ligated because there was no broad ligament in the proper sense, nor could I find where the ovarian artery entered; I could not therefore intelligently apply a ligature on that side in any way.

You have heard me say that in removing intraligamentous and retroperitoneal tumors of the uterus, or its adnexa, the correct way to make the incision through the capsule is in a longitudinal direction, because if you make a transverse incision, you may divide the ureter which may have gotten into this abdominal position; but in this instance a longitudinal incision was not indicated, and I was compelled to make a transverse incision, though I made it not exceeding two inches in length, examining carefully to determine if the ureter occupied the anterior position. Having divided the capsule, you saw me dissect with my fingers close to the tumor until I exposed the surface the size of a dollar, then, with the assistance of Professors Rodman and Frank, the tumor itself was caught with a vulsellum forceps and pulled up. I continued my dissection around the tumor, while the capsule was thrown farther and farther off, catching the bleeding vessels as encountered with forceps. Finally, getting deeper through the tough tissues, I discovered that, instead of the intraligamentous

enlargement being one tumor, it was composed of many tumors. I then began enucleating one after another, until I removed seven before reaching the base of the broad ligament. When this was accomplished I was able to ligate and remove the thickened tissues of the capsule upon the right side near the pelvic wall, and divide these tissues down to and below the internal os. In order to do this I had to apply several ligatures; when I had succeeded in dividing both sides down nearly to the vagina, I pulled up the uterus and the part of the capsule from which the tumors had been enucleated, stripped off the peritoneum from in front and behind, and brought both the capsule and the uterus through the abdominal wound.

The next question was how to treat the pedicle; should I treat it after the intra-abdominal and extraperitoneal fashion; should I extirpate the entire neck of the uterus, or should I fix the pedicle in the abdominal wound and treat it after the extraperitoneal fashion? The operation was so difficult, consequently so prolonged, that I did not want to keep the woman longer on the table than was absolutely necessary. I therefore threw a *næud* around the neck of the uterus at the base of the capsule, and treated the pedicle extraperitoneally, because this is the quicker method. Now, had I attempted to remove the uterus in its entirety, or if I had attempted to ligate the uterine arteries where they approach the neck of the uterus, and then treated the stump after the intra-abdominal but extraperitoneal method, it might have caused the death of the woman from shock.

In the "American Text-Book of Gynæcology" there is a paper by Krug and Pryor upon intraligamentous myomata which is about the best I have seen. These gentlemen have had a broad experience in the treatment of these cases, and have devised useful means. I remember that in the beginning of the paper they say that intraligamentous myomata are the most difficult and dangerous conditions that the surgeon has to contend with, and that these tumors are peculiar, because they are not benefited by the removal of the ovaries and the tubes, and because they cannot be removed and the pedicle treated extraperitoneally. Notwithstanding the statements of these two eminent surgeons, this is the second case of intraligamentous myomata that I have treated by this method.

In this case you noticed that after applying the *næud* I sutured the abdominal peritoneum of the wound to the peritoneum of the pedicle below the constricting wire. This was done to shut off the peritoneal cavity from the tissues above, so that if they become necrosed, and if septic matter is formed in the necrosed tissue, the union

of the peritoneum of the abdominal wall to the peritoneum of the pedicle below this ligature becomes so firm that the septic matter cannot enter the peritoneal cavity. So in removing these tumors, intraligamentous or otherwise, where the pedicle is treated by the extra-peritoneal method, never fail to suture the abdominal peritoneum to the peritoneum of the pedicle below the ligature of the *nœud*; the balance of the wound may be closed by interrupted silkworm-gut sutures, as in any abdominal operation.

This woman has just been taken from the operating-room with a pulse of 75, and no shock. This case is another illustration of features to which I have called your attention on more than one occasion. That every surgeon who opens the abdominal cavity should be prepared to treat any and every condition that may be encountered; that we never know the difficulties we will have to contend with though we may have a broad experience; and we will often find the greatest difficulties where we had expected smooth sailing. In this case I expected difficulties because of my belief that this was an intraligamentous myoma, but I did not expect to be forced to deal with a condition so complicated. When the incision was made, in an examination of all the pelvic structures connected with the tumor, and its surroundings, by the sense of touch and of sight, I could not say whether this enlargement was the result of a single myomatous growth or a number of such tumors held together in one general capsule. That was not detected until I had enucleated to a considerable extent, and found that one growth could be taken out after another.

The dangers of this operation are: first, wounding important structures; the ureter is occasionally displaced and in front of the myoma, and may be so situated that you cannot by the most careful observation detect its abnormal position. Instances have been reported where the ureter has been found running between myomata in the broad ligament, and consequently could not be detected until it was torn, and possibly not even then.

Second, of hemorrhage, because of large vessels that course over and through the capsule surrounding these tumors. There are sometimes huge sinuses with fragile walls that break through readily when you use the ordinary sharp-edged forceps. In this case the patient did not lose more than a half pint of blood, because as soon as bleeding occurred forceps were applied, and if necessary a ligature. And just here I would call your attention to the fact that the forceps I use have smooth surfaces upon the blades, and are more rounding than the

ordinary forceps, hence they do not cut through the fragile walls of the large vessels.

In our efforts to enucleate these tumors from the base of the broad ligament, extending as deep as they did in this case, there is danger of tearing into the deep pelvic vessels, and possibly causing the death of the patient. I injured no deep vessels; by the timely application of forceps and ligatures, there was little hemorrhage from the ovarian or uterine arteries, though the tumor extended up under the sigmoid flexure of the colon, having unfolded its mesentery.

There are, as I have previously stated, three ways of treating the neck of the uterus in hysterectomy for the removal of myomatous tumors. First, as I did in this case, extraperitoneally by throwing around it a *nœud* or gum ligature, and running through the neck fixation-pins to hold the pedicle in its proper place. This is the original method of Keith adopted by Bantock, who is one of the most successful hysterectomists and abdominal surgeons in London. He still adheres to this method, and there are many other operators of renown who also practise it.

Another method, practised by Dr. August Martin, of Berlin, and other gynecologists, is total extirpation of the neck, severing it from the bladder and from the vagina, closing the vaginal vault and the peritoneal cavity after removal of the organ. In other words, bringing the edges of the vagina together, mucosa to mucosa, serosa to serosa, even picking up the connective tissue between the vagina and the peritoneal edges above, and uniting it, closing the abdomen entirely and using no drainage. But in intraligamentous tumors Martin has drained through the vagina. He sometimes, after removing the tumor, stitches up the sac, thus shutting off the peritoneal cavity, connecting all the raw surfaces from which the tumor has been removed with the vagina.

Another method known as the intra-abdominal, but extraperitoneal method, is done after the same fashion that all hysterectomies are performed until you get down to the base of the broad ligament, then you ligate the uterine arteries on each side, carefully avoiding the ureters, then cut the uterus off deep down nearly to the vagina, and sew the peritoneal covering in front and behind together. By this means the neck of the uterus is thrown entirely outside the peritoneum, and it drains, if necessary, through the neck of the womb into the vagina. This operation has been frequently adopted by Dr. Baer, of Philadelphia, and by many other operators in this country and Europe.

Now, which method of treating the pedicle should be adopted?

That depends upon two things; first upon the conditions with which we have to deal. In one case we can more easily treat the pedicle by the extraperitoneal method; in another we can do better by the intra-abdominal but extraperitoneal method; and in still another we can best treat it by total extirpation. And second, it depends upon the operator himself. One man may be peculiarly fitted for the treatment by one method because of his experience; another has had more experience in the treatment of the pedicle by another method. So that if three men were to operate upon the same case, one would probably have better results, as does Bantock, by the extraperitoneal method; another would have better results, as does Martin, by the total extirpation; another would have better results, as does Baer, by the intra-abdominal but extraperitoneal method.

As to the relative mortality in the cases treated by the different methods, there is hardly any difference. When you take the statistics of Bantock and a few other gentlemen who have been very successful by the extraperitoneal treatment of the stump; when you take the statistics of Martin and a few others who have had successful results by the total extirpation method; when you take the statistics of Baer and a few others who have had successful results by the intra-abdominal but extraperitoneal method, you will find that the mortality by one method is practically the same as by the others.

There is another means of removing these tumors, and that is *per vaginam*. The German surgeons nearly always attack these tumors of every size from above through the abdomen; the Americans usually do the same, though there is a tendency now, both by the Germans and Americans, to adopt in some cases the vaginal method. But the vaginal method is still in its infancy in this country, and owes its introduction to the French surgeons, having been first performed by that distinguished old surgeon of Paris, Péan. Péan removes myomata of the uterus as large as a fetal head *per vaginam*, by taking them away as it were piecemeal, and he has had results superior to those of operations through the abdomen. No other country has as yet, with but few exceptions, adopted the vaginal method for large tumors, but where the tumors are comparatively small and can be removed *per vaginam* without cutting them to pieces, or can be removed *per vaginam* by section of a tumor, then I claim that the vaginal method is by all means to be preferred.

Another patient that we have just examined has a fibroid tumor of the uterus apparently about the size of a goose's egg; and it is my purpose, when we operate upon her, to remove the tumor together with the

uterus through the vagina. Only recently I removed through the vagina a uterus having several myomatous growths, without trouble, and the woman had not an untoward symptom.

By the vaginal method there is less danger of hemorrhage, and convalescence is more speedy. There is not half the shock that obtains in the abdominal method, neither is there half the danger of sepsis, and there is of course no danger of ventral hernia which often follows abdominal hysterectomy. In all cases of malignant disease of the uterus that are operable, hysterectomy ought to be performed *per vaginam*, and if the disease does not involve adjacent structures, and the operation should certainly be performed before this has occurred, then nearly every case ought to get well. I advise, then, that you remove all cancerous or myomatous uteri, where it can be done without cutting the tumor to pieces, through the vagina; as a rule there will be less shock, and the operation can be performed very rapidly, sometimes within fifteen to twenty minutes. Your patient has no trouble, the vaginal vault heals within a short time, and a cure results, unless there is a recurrence of the malignant disease.

Ophthalmology.

GLIOMA OF THE RETINA.

CLINICAL LECTURE DELIVERED AT THE ROYAL LONDON OPHTHALMIC HOSPITAL.

BY E. TREACHER COLLINS, F.R.C.S.,

Curator and Librarian to the Royal London Ophthalmic Hospital, England.

GENTLEMEN,—It is frequently said, in commenting on the recent progress in medicine, that though great advances have been made in the art of diagnosing diseases and in the knowledge of their pathology, but little has been done for their treatment. I propose now to take one disease and to show how much a study of its natural history has effected, not only in enabling us to relieve the sufferings of those afflicted with it, but also sometimes to effect an absolute cure.

The disease which I select for this purpose is glioma of the retina. Sixty years ago it was not known by that name; it was then termed fungus hæmatoides, encephaloid tumor, or medullary degeneration. It was not then clearly differentiated from such affections as tubercle or leuco-sarcoma of the choroid and inflammatory effusions into the vitreous, consequently only an imperfect clinical picture of it could be drawn.

The disease is said by Mackenzie to present three stages: (1) When the growth is deeply seated in the eye and can be seen through the pupil behind the lens, and when generally there is no pain or inflammation. (2) When the globe has become enlarged, the sclerotic and cornea being expanded by extension of the growth, and when the patient has severe fits of pain, often delirium and fever. (3) When the cornea has given way and a large fungating, sloughing, irregular mass protrudes through it, the discharge and hemorrhage from which give rise to great exhaustion, the patient ultimately dying comatosed and convulsed.

Sixty years ago, though excision of the eye was sometimes resorted to, the results were so unsatisfactory that the disease was looked upon as a necessarily fatal affection. Thus Syme wrote in the *Edinburgh Medical and Surgical Journal* in 1835: "In adding another instance of unsuccessful extirpation of the eye for medullary degeneration to

the many which are already upon record, I cannot refrain from expressing my conviction that it would be better for the interests of humanity and for the credit of surgery if this operation were entirely abandoned." It was urged as one reason against operation that cases were known where the eye was not removed, but the patient put upon a course of mercury and in which the eye had subsequently shrunk. These, we may be sure now, were not really cases of glioma, but were what is often spoken of as pseudo-glioma,—*i.e.*, an inflammatory affection where plastic effusion has been thrown out into the vitreous, and in which the appearances of glioma are very closely simulated. I shall refer to it again later on.

Gradually, as the methods of observation have been improved, the diagnosis of glioma of the retina has become possible at a much earlier stage. Cases, too, are brought to the surgeon much sooner than formerly, partly owing to the increased facilities there are for getting about, and partly to the increased number of establishments at which skilled advice can be obtained.

Now an eye is excised immediately the diagnosis of glioma of the retina has been arrived at, so that we practically never see cases in the third stage, as described by Mackenzie, and only very rarely in the second stage. The name fungus hæmatoides for this disease seems now somewhat inappropriate, and has fallen quite into disuse.

Not only have patients been saved the sufferings as regards the eye which these last two stages entailed, but some by its early excision have been completely cured. It can now be asserted as conclusively proved that, provided a glioma of the retina is removed sufficiently early, no recurrence will occur, and the child will grow up as strong and well as if it had never been affected with this serious disease. Some years ago Mr. Lawford and I traced the after history in a large number of cases in which an eye had been removed for glioma of the retina at Moorfields Hospital. We also made a careful study of all previously published cases; as the result of our investigation we established this fact, that no well-authenticated case of glioma of the retina has ever been recorded in which the growth recurred later than three years after the removal of the eye. Vetsch recorded a case in which three years after the excision of the eye a secondary growth occurred in the parotid gland, which was decided after microscopical examination to be gliomatous. This is, however, a unique case, the usual interval between the operation and the primary growth and the appearance of the secondary one is much shorter. The longest period of quiescence in any of the cases which I have followed up has been one year. In

view of Vetsch's case, however, it seems that a patient cannot be pronounced safe from a recurrence under three years from the operation. I have now notes of twelve cases who have passed this limit, in which I have myself confirmed the diagnosis of glioma by microscopical examination of the growth. These may, therefore, be regarded as permanent recoveries. In one of them I saw the patient alive and well nineteen years after the removal of the eye, in another fourteen years after, and in a third eleven years after.

Glioma of the retina sometimes affects both eyes. Out of seventy-two cases of which I have notes, in twenty-three there were growths in the two eyes, commencing either simultaneously or after a longer or shorter interval. The longest period I have known elapse between the time the growth was first noticed in one eye and that when it was first noticed in the other was three years. The growths in the two eyes cannot be regarded as the one secondary to the other, but must be looked upon as both primary tumors. For after removal of both eyes for glioma a child may remain free from any other signs of the disease, so that it is impossible for it to have spread round from one eye to the other by continuity along the optic nerves and commissure. I have notes of one case in which the two eyes were removed at the interval of nine months, and in each there was a tumor presenting the typical microscopical appearance of *glioma retinæ*. I saw the patient four years and seven months after the removal of the second eye, and she was then in perfect health, well developed, and well nourished. Of another, from whom both eyes were excised on the same day for glioma of the retina, and whom I saw alive and well three years and four months later, and of a third from whom the second eye was removed fourteen months after the first for the same affection, and who was alive and in good health three years and two months after the excision of the second eye.

To remove the two eyes of a patient is naturally an objectionable thing to be called upon to do. Some surgeons have even thought it better to let the patient die of the disease rather than allow him to grow up absolutely blind. This, however, is a question of ethics upon which I do not intend to enter, being content to accept the principle that it is the surgeon's duty to prolong life whenever it is possible. The cases quoted above show definitely that sometimes by the removal of both eyes, when affected by glioma, life may be saved.

Seeing how important it is that glioma of the retina should be recognized in as early a stage as possible, it is necessary to pay particular attention to the first symptoms it presents.

Glioma of the retina is a growth which occurs only in childhood: no well-authenticated case has been recorded in which it was first detected in a patient over eleven years of age, it is most frequently met with during the first two years of life, and in some cases it is undoubtedly present at birth.

The symptoms which it presents in the first stage vary according to the position of growth; sometimes it starts chiefly from the outer surface of the retina, displacing that structure in front of it, and forming a mass between the retina and choroid; it is then spoken of as glioma exophytum; at other times it grows from the inner surface of the retina into the vitreous chamber, when it is termed glioma endophytum. In glioma exophytum, the retina being in front of the growth, a white, smooth mass is seen close behind the lens with the retinal vessels coursing over it, which show up plainly against the light background, and which are largest towards the centre of the lens, branching and narrowing as they pass outward. In glioma endophytum, on the other hand, a white, irregular, nodulated mass is seen far back in the fundus, which, lying in front of the retinal vessels, obscures them from view. Sometimes, in these cases, secondary floating nodules are seen in the vitreous and occasionally hemorrhages.

The growth gives rise to a bright reflex from the fundus, something like that seen from the tapetum in animals' eyes; it is this which generally first attracts the parents' notice. Occasionally a history of the eye having turned in previous to the reflex being seen is obtained.

At first there is no increase of tension, no shallowing of the anterior chamber, and no opacity of the lens, though later all these changes make their appearance.

There are three well-recognized conditions of the eye which give rise to a white reflex behind the lens, so closely resembling a gliomatous growth that it is often very difficult to diagnose it correctly from them. They are,—

1. Tubercle of the choroid.
2. An inflammatory effusion into the vitreous, following retinitis and cyclitis, accompanying which there is usually also detachment of the retina.
3. A congenital defect at the posterior surface of the lens, with persistence of the hyaloid artery.

It is those cases of tubercle of the choroid where there is a large aggregate mass of growth which are so difficult to distinguish from glioma, and not, of course, those in which scattered miliary nodules are detected ophthalmoscopically. Iritis is a more frequent accompa-

niment of tubercle of the choroid than it is of glioma of the retina. Fortunately, in both classes of cases, it is advisable to excise the eye, for in some to distinguish between them clinically is quite impossible.

The second class of cases is one to which the term *pseudo-glioma* is most frequently applied. It is an affection rarely, if ever, met with except in children. The changes in the eye are generally preceded by head symptoms, such as unconsciousness, convulsions, or prolonged headache, occurring after one of the acute specific fevers, in the subjects of congenital syphilis, and sometimes without apparent cause. In a large number of these cases, if careful examination is made, middle-ear disease will be discovered, and it seems probable that this ear-disease sets up meningitis, and that inflammation of the meninges extends along the optic nerve to the eye. The inflammation in the eye varies much in its acuteness, a variable amount of plastic exudation is thrown out into the vitreous, which later organizes and contracts. By its contraction it drags the retina away from the choroid, retracts the root of the iris, and pushes forward the lens. This organized lymph, seen through the lens with new-formed blood-vessels in it, looks very much like a gliomatous growth; to distinguish the one from the other, attention should be paid to the condition of the anterior chamber, the character of the blood-vessels in the mass behind the lens, the tension of the eye, and the history of the case. In glioma the anterior chamber may be uniformly shallow, but it is never shallow in the centre and deepened at the periphery, as is frequently the case where an organizing inflammatory membrane is present.

The blood-vessels generally seen in glioma are, as I have already mentioned, retinal vessels, which are largest at the centre of the lens, and diminish and branch as they extend outward. The blood-vessels developed in an inflammatory membrane come from those of the ciliary body, and are largest at the periphery of the lens, diminishing and branching as they course inward. In glioma of the retina the tension is normal or plus, exceedingly rarely minus. In the inflammatory condition it is frequently minus, but may be plus. The history, as may be gathered from what I have already said, is frequently of assistance in arriving at a diagnosis.

The congenital malformation, which so resembles glioma of the retina that eyes in which it is present have several times been excised, is one in which there is an abnormal development of the anterior part of the vitreous humor. A dense layer of fibrous tissue is found immediately behind the lens, into which a persistent and still patent hyaloid artery passes and breaks up.

The membrane behind the lens in these cases is usually of a grayer color than a gliomatous tumor; it is sometimes confined to the centre of the lens, a red reflex being obtained with the ophthalmoscopic mirror from the periphery of the lens in all directions. In the centre of the membrane a spot is sometimes seen, indicating the position at which the central artery joins it.

In conclusion, I wish very emphatically to state that when any reasonable doubt exists as to whether an eye contains a gliomatous tumor or not, by far the safest plan is to resort to excision rather than to allow time to elapse for the purpose of making quite certain of the diagnosis. The eyes which present appearances likely to be mistaken for glioma always have very defective vision, and often no perception of light. It is far better for a patient to sacrifice a functionally useless organ than to run the risk of having a malignant growth spreading into parts from which it cannot be removed.

HERPES ZOSTER AND OPHTHALMIC "SHINGLES."

CLINICAL LECTURE DELIVERED AT THE NEW YORK POST-GRADUATE MEDICAL
SCHOOL AND HOSPITAL.

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School and Hospital, etc.

GENTLEMEN,—This afternoon I will call your attention to one of the most interesting neuroses affecting the eye, and the patients to be presented later are fine examples of ophthalmic shingles. Herpes is a term derived from the Greek *ἔρπω*, "I creep." The French form is *Herpès*; the German, *Flechte*. Zoster is from the Greek word *ζώνη*, meaning "a girdle." Herpes zoster is called by the French "*zona*," and by the Germans "*zoster*," or *Gürtelrose*. In early times it received various names, as "*Feu de Saint Antonie*," "*Ingis sacer*," and "*Dartre phlycténoïde en zone*."

Herpes zoster is an acute inflammation of the skin, occurring along the course of a cutaneous nerve, and is produced directly by nerve influence. One of the most remarkable characteristics of herpes is its occurrence on one side of the chest, where it forms a half-girdle, or belt, which but rarely encircles the entire thorax. This peculiarity has gained for the affection the various names of "*zona*," a woman's girdle; "*zoster*," a man's girdle or belt; and our popular expression of "*shingles*," which Dr. Johnson derives from the Latin *cingulum*, "*a girdle*." That zoster may occur on both sides simultaneously cannot be denied, yet it is extremely uncommon. Herpes zoster may be produced by either traumatic or pathological influences. Traumatic zoster is more rare, and usually results from a heavy weight falling on some portion of the body, as in the case reported by Dr. Taylor, in which a traumatic neuritis of the cervical plexus on the left side caused severe zoster on the skin areas to which the nerve filaments were distributed. An injury sufficiently severe to produce neuritis of the cutaneous nerve-trunks will, as a rule, be followed by an eruption of

vesicles along its course. Cases have been reported by Weir Mitchell, Rouget, and Oppolzer. The pathological influences which produce the vesicular eruption of zoster are many and diverse. Bazin considered many cases to be due to an arthritic influence, always so when occurring in children. Exposure to cold often occasions its development, and has a marked influence on the arthritic variety. Strange as it may seem, an indirect cause of the affection is sometimes found in the emotions, such as sudden joy or grief. This influence, felt in the central nervous system, is reflected to some of the peripheral cutaneous nerves of nutrition, resulting in these changes in the skin. Cases are on record in which the pains of zoster have been felt immediately after some exciting emotion of this nature. Mr. Hutchinson, of London, has reported a number of cases in which the cause was the internal use of arsenic, and a number of observers, both in England and the United States, have noticed the same thing. In all these cases the arsenic was administered for the relief of some chronic skin affection.

Some years ago, when I was in charge of the New York Dispensary for Diseases of the Skin, I saw a patient, fifty years of age, with acne of the face, who, after treatment for a month by external remedies, was ordered liquor potassii arsenitis, in gradually-increasing doses. After continuing this treatment for two weeks, she complained of pain on the right side, between the sixth and eighth ribs, and midway between the spinal column and the vertebral border of the scapula. Examination showed the vesicular eruption of zoster in the painful region. So many cases have been reported from the use of this drug that I think their occurrence must be more than a coincidence. According to Erb, zoster is only the local manifestation of a constitutional malady, derived from an external cause,—namely, the deposition of an infectious germ. This applies only to the so-called "spontaneous zoster," and has nothing to do with the traumatic or secondary forms, which, if the theory be accepted, must be regarded as differing essentially from genuine herpes zoster. All writers admit that zoster is very apt to become epidemic, especially in hospitals devoted to skin-diseases; and this circumstance, never hitherto intelligently accounted for, is ascribed by Landouzy to the prevalence of atmospheric conditions favorable to the ripening of the specific germ. Believers in the germ origin of disease hold that the specific microbe produces an irritation of the spinal ganglia, and the cutaneous symptoms are simply the indirect consequence of trophic disturbance due to the irritation of the nerve-filaments. The special germ has thus far not been discovered. Dr. Gerne thinks that an analogy exists between this dis-

ease and the eruptive fevers, and this view, although he does not so express himself, favors the germ theory of the disease. I am, however, not yet willing to accept this view of the nature of zoster. Syphilis has been known to be an exciting cause, and when so produced the eruption of vesicles is bilateral. Bärensprung and Charcot, as a result of their many investigations, conclude (1) that an inflammation of the spinal ganglia, anatomically characterized by well-marked vascular injection and a proliferation of the perineurium, without a lesion of nutrition, produces in the portion of skin which receives innervation from the parts affected a special alteration of nutrition of the nature of zoster; (2) that the neuralgia which accompanies or precedes the eruption is the result of the excitation of sensitive nerve-filaments passing through the canal; (3) that the spinal ganglia contain the trophic nerve-filaments of the skin. . . . Zoster appears to be due to disease of the ganglionic system more often than dependent on affections of the spinal cord, and it occurs infrequently as a reflex neurosis.

Anatomical Characters of the Vesicles of Zoster.—In a horizontal section we find the epidermis raised, the corium more or less laid open, and septa spread out between the two in such a manner as to subdivide the vesicle. The external covering of the vesicle consists of the non-nucleated cells, which make up the epidermis, arranged in layers, one upon the other; these cells do not stain with carmine. The next layer is made up of cells containing nuclei which do stain with carmine; these are flat and arranged in layers, the innermost adhering to the superior surface of the stratum Malpighii. The interior of the vesicle is divided and subdivided by thick septa, which traverse it in all directions. These septa consist of different layers of tightly-packed, long, spindle-shaped cells, which show a nucleus when carmine is added. On the superior surface of the corium long cells adhere, which are separated by epithelial and other cells, mostly round, and partially stained by carmine. These are like those of which the corium is made up. In the puffed-up areolar tissue of the corium are a few round, granular cells, as large as white blood-corpuscles, which assume a rosy tint when stained with carmine. The vessels of the papillæ are enlarged, and contain many blood-globules. When a vesicle is becoming changed into a pustule, rose-colored cells, the cells of the corium, and those in the septa increase, and by this process push apart the epithelial cells on the floor of the vesicle. The cells are often so enlarged as to contain from two to three nuclei, and those on the corium arrange themselves on the blood-vessels as far as the

subcutaneous areolar tissue, where they surround the nerve-trunks and press sharply upon the nerve-covering. They cause the neurilemma to puff up and the white substance of Schwann to disappear, leaving the axis-cylinder alone. This pathological fact makes easy the explanation of the severe attacks of neuralgia which not only accompany, but usually precede, the eruption of vesicles. Danielssen gives an account of an autopsy on a person dying of pneumonia, where the pains of zoster in the left side of the chest occurred before death. The sixth intercostal nerve was greatly swollen throughout its ramifications to the skin; the swelling was caused by a hard, transuding substance poured out into the neurilemma. The axis-cylinder was, however, normal. Bärensprung reports an autopsy on a patient dying of zoster, in whom there was gangrene of the skin between the sixth and ninth ribs. In this case the ganglia at the commencement of the sixth, seventh, and eighth intercostal nerves, as well as the portion of nerve beyond, were infiltrated with pus. He believes that zoster is dependent upon affections of the ganglionic system, rather than upon alterations in the peripheral nerves themselves. This latter view is held by Curshmann and Eisenlohr, and is apparently substantiated by the following case: The patient had zoster of the forearm and arm; some small nodules, which were noticed along the branches of the axillary and other nerves, were examined microscopically, and proved to be perineuritis acuta nodosa, originating in the blood-vessels of the nerve-sheath and perineural connective tissue; the nerve-substance itself was intact. At a subsequent post-mortem examination the spinal ganglia were found normal in appearance.

Herpes zoster possesses points of interest which are peculiar to itself, and which transcend those referring merely to diagnosis and treatment. It is an acute inflammation of the skin, produced directly by nerve influence. Probably there are many other forms of inflammation, both of the internal organs and of the surface of the body, yet "shingles" is by far the best example. In traumatic zoster the symptoms usually come on in a few hours after an injury, and the eruption occurs along the course of a cutaneous nerve, arising from a nerve or plexus injured. When appearing idiopathically, it is usually preceded by general malaise, fatigue, nausea, and headache; in some cases there is an elevation of temperature. In the skin about the seat of the eruption a sensation of warmth or a severe neuralgic pain is felt; and on removing the clothing to discover the cause, nothing will be seen, not even redness. In a few hours, twenty-four to forty-eight, on the painful area of skin, red points arranged in oval

groups will be seen, and very soon each point shows a vesicle, the largest of which are about the size of a millet-seed. These are at first very clear and pellucid, and are often found grouped together, not exactly confluent, but very closely associated. Sound skin exists between them, in which respect the affection differs from erysipelas, for which it has often been mistaken. The vesicles may at a later period contain blood-stained serum, and afterwards opaque pus. The eruption runs a more or less definite course of from ten days to a fortnight, at the end of which time the scabs fall off, leaving generally deep cicatrices like those from variola. The eruption will be found, as a rule, upon one side of the body only. If the fifth cranial nerve is the one affected, the eruption often occurs upon the forehead; if one of the intercostal nerves be affected, then the eruption is found on the side of the chest or on the abdomen. If the eruption is on the trunk, it generally begins behind at the spinous processes of the vertebræ, the vesicles arranging themselves in a curved line, passing obliquely downward and forward on the trunk, and approaching the median line in front, beyond which they very rarely extend. Zoster occurs, as a rule, but once in the same person. Sometimes, in rare cases, papules, bullæ, or pustules may appear instead of vesicles; in other cases the neuralgia may be intensely severe before, during, and after the eruption, and occasionally the eruption is bilateral. It may occur at any period of life, and the two sexes are equally liable. Interesting cases of recurring zoster have been noted, as, for example, that reported by Tilbury Fox, in which a male, thirty-three years of age, was affected with zoster three successive years. Kaposi has reported a case in which the eruption appeared five times within a comparatively short period over the right cervico-brachial plexus, and the sixth time in the lumbo-sacral region. Sometimes the eruption does not appear for two weeks after the neuralgia, but it continues over the implicated nerve-twigs from three to six weeks. If the patient scratches the affected skin, deep ulcers form, which on healing leave deep and ugly scars. Occasionally ulcers occur without scratching, and in Bärensprung's case there was quite extensive gangrene of the skin. This certainly points to the trophic nature of the disease. The nervous symptoms in zoster may be of a motor nature, as in the case reported by Broadbent, in which an old woman had permanent partial paralysis of the arm, following zoster. Other observers have reported similar cases. These motor disturbances are, however, quite rare.

Cases of herpes eruption after coal-gas poisoning have not been infrequently observed. It is thought by some authors that mycotic

thrombosis is the cause. Leudet and Barié were the first to call attention to the frequency of herpes in tuberculous patients. It is our opinion that herpes occurs, not from any one special cause, but as a result of a general lowering of tone of the system, as we have frequently noticed in cases coming under our observation that it followed conditions of great debility, as, for example, *la grippe*.

In speaking to you of zoster to-day, gentlemen, I shall adopt the following classification, which, although, strictly speaking, covering the whole area of nerve distribution, includes ophthalmic shingles, which is of more particular interest to us:

Zoster	{	Facialis.
		Cervicalis.
		Brachialis.
		Thoracicalis.
		Abdominalis.
		Lumbalis.
		Sacralis.

Zoster Facialis.—In this variety the fifth cranial nerve is the one affected. *Zoster frontalis seu ophthalmicus* is the most interesting variety in this group, and Hebra says of it, "that often the eruption appears upon the forehead and scalp in the course of the supra-orbital nerve, passing from the supra-orbital notch upward to the top of the head. In some of these cases the eye is also affected, the vessels of the conjunctiva being injected, severe pain being complained of, and the motility of the iris being so much impaired that the disease may simulate iritis." The nerve most frequently affected is the supra-orbital, and the next in frequency is the supra-trochlear, yet the latter never suffers alone. Both are often affected without the other branches of the fifth nerve being involved, and when this happens the eye is not so apt to become inflamed. The nasal nerve, a branch of the fifth which finally divides into the infra-trochlear and external branches, and supplies the middle and tip of the nose, is said to play an important part in the eye symptoms of ophthalmic shingles. Mr. Hutchinson, of London, says he has never seen the whole side of the nose covered with vesicles without also witnessing inflammation of the eye, and he has never seen the eye inflamed from herpes unless the vesicles were also visible on the side of the nose. He considers the nasal nerve the trophic nerve of the eye. This view, advanced nearly twenty years ago, has recently been brought forward again by Badal, who, calling this nerve the trophic nerve of the eyeball, advises stretching of the infra-trochlear nerve, one of its branches, for glaucoma and for painful ocular neu-

ralgia. Careful observers have confirmed Hutchinson's views. We have, however, frequently seen the eye inflamed when the eruption did not occur along the course of the nasal nerve. The following case may serve to give a clinical picture of the disease: This patient, a man, thirty-four years of age, came under our notice one week ago, having for two weeks previously complained of severe pain on the left side of the forehead, nose, and scalp, as far back as the frontal suture. When first seen there was great swelling of both the upper and lower eyelids, but mostly of the upper; there was severe conjunctivitis with chemosis; the pupils were irregular, and there was some superficial keratitis. The eye symptoms were most marked when the eruption of vesicles was at its height. The cornea was anæsthetic, and the keratitis was of the neuro-paralytic variety. The eye symptoms were severe, and his sight is now lost in consequence of extensive changes which have taken place in the cornea. The eruption of vesicles follows the course of the supra-orbital and nasal nerves; it is also limited to one side, and does not cross the median line of the forehead or nose, and does not affect the cheek, although there is some œdema of the part, produced by the surrounding inflammation. In this case, as in many others, the cicatrices are already showing themselves, and they are invariably deep and permanent, and by their arrangement it is usually easy to recognize the condition years after it has occurred. If the eye becomes inflamed when the eruption first appears, the organ is generally very severely affected, but the inflammation is of a mild type if it occurs towards the termination of the attack. When the disease has subsided, the eyeball is left somewhat anæsthetic, and the patient often complains that the skin feels numb and stiff like parchment, and that there is a severe burning sensation; as one patient expressed it, the skin feels "crisp." Occasionally an eye is lost by general inflammation of the globe, as in the patient before us. In other cases, where the nasal branch is affected, we have seen only one vesicle showing itself upon the cornea, and giving rise to a considerable annoyance from the photophobia and neuralgia, due to the breaking of the vesicle and the exposure of the peripheral nerve-twigs of the cornea. In the healing of such ulcers, produced by the breaking of these vesicles, deformity of the cornea frequently ensues, producing an astigmatism, due to change in the corneal curve. During the past twelve months we have seen, in private and dispensary practice, no less than six cases of this variety, in none of which, except in the one before you, has the eye suffered to any serious extent, except as heretofore mentioned, in the breaking down of one or two individual vesicles. I may add that

such vesicles occurring on the cornea are extremely slow in healing, and resist the ordinary means of treatment more than the ulcers from ordinary traumatic causes.

Zoster Cervicalis is that variety of zoster which is found distributed on portions of the skin supplied by the superior cervical nerves, the points of emergence being near the middle and lateral portions of the neck. It is an unusual form.

Zoster Brachialis.—It generally begins in the median line, posteriorly, in the region of the first dorsal nerve. A few vesicles may appear on the median line, then some along the course of the circumflex nerve, and, when very extensive, some may appear on the arm and hand.

Zoster Thoracicalis.—This is the most common variety, and the one from which the name "zoster" seems to have originated. The dorsal, intercostal, and thoracic nerves are the ones affected; the widest part of the eruptive zone is in the dorsal region, but the anterior part of this zone may occupy the mammary region or extend to the umbilicus. In sixty-five observed cases, thirty-nine were males and twenty-nine females, and the right and left sides were equally affected. The pain which precedes the eruption in this variety may be often mistaken for acute inflammation of the pleura, the pain being more severe in this form by reason of the respiratory act. The eruption is usually unilateral, though it may occur on both sides at once.

Zoster Abdominalis.—Here the eruption follows the course of the perforating thoracic nerves and the cutaneous branches of some of the lumbar plexuses, the eruptive zone occupying the region of the umbilicus.

Zoster Lumbalis.—The eruption here is distributed along the branches of the lumbo-sacral, external femoral, and internal saphenous nerves; the vesicles occur upon the genital organs and inner surface of the thigh.

Zoster Sacralis.—The eruption is distributed along the cutaneous branches of the sacral and sciatic nerves, and the vesicles may extend as far down as the heel. This is of rare occurrence, and the pain may at first be taken for sciatica.

The prognosis of ordinary uncomplicated zoster is favorable, and no danger is to be apprehended; the severe pain that frequently follows the healing of the vesicles generally ceases in a few weeks. When the disease occurs in old and cachectic persons in whom gangrene of the skin has been a complication, the prognosis is more grave, and the disease is apt to terminate fatally. There is a vulgar but erroneous

notion that the disease proves fatal when the eruption surrounds the body or trunk ; this idea is as old as the time of Pliny. We have already mentioned the prognosis in cases of ophthalmic shingles.

The treatment consists in local and internal medication, and is mostly of an expectant character. Local treatment is directed especially to the protection of the vesicles from irritation by the clothing. This is best done by anointing the parts with carbolic ointment or cocaineized vaseline. Painting the parts with collodion makes a very good protective dressing for the vesicles, but in some cases it temporarily increases the pain by contracting the skin in the vicinity. Hypodermic injections of cocaine hydrochlorate over the nerve supplying the painful area is of immense service ; ointments containing cocaine and morphia may also be applied to the vesicular patches. The constant galvanic current has been found very beneficial in the relief of the neuralgias. Two or three applications may be sufficient to render the patient entirely comfortable until the healing process is completed. Static electricity, applied both over the course of the nerve and at its origin, has also been found extremely useful in allaying the severe pain. For the painful neuralgia occurring after the healing of the vesicles, oleic acid containing some drug such as morphine, cocaine, atropine, or daturine may be used as an inunction. In our hands antipyrin has been found exceedingly useful in relieving these severe pains at all periods of the disease. It is given in doses of five grains, repeated at intervals of an hour. In ophthalmic shingles the eye symptoms are treated locally in the usual way, and internally quinine and iron may be given for their general tonic effect upon the system. We have, however, found that when the healing of the ulceration of the cornea produced by the rupture of a vesicle is obstinate to ordinary means of treatment, such as atropine or cocaine instilled into the eyes, that such ulcers heal readily after gentle touching with the galvano-cautery. We have not found the old, popular, domestic remedy, "the blood from a black cat's tail," of any benefit.

Laryngology, Pharyngology, Rhinology, and Otology.

THE FORMS OF EPITHELIAL HYPERTROPHY IN THE LARYNX.

CLINICAL LECTURE DELIVERED AT THE GOLDEN SQUARE HOSPITAL.

BY GREVILLE MACDONALD, M.D.,

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GENTLEMEN,—The laryngeal cavity for two reasons is especially interesting for the histological and clinical study of various forms of epithelial overgrowth. In the first place we have two distinct systems of epithelium in the normal condition. The greater part of the interior of the larynx is covered with stratified, columnar, ciliated cells, with intervening goblet cells, in common with the nose and the respiratory passages beyond the larynx; but throughout the whole length of the vocal cords we find pavement epithelium, which is carried over the posterior wall of the larynx till it joins that of the pharynx and œsophagus, while as it merges into the ventricle above and over the free margin on to the subglottic surface of the cords below, where it gradually assumes the columnar, ciliated variety. An essential point to be remembered in connection with this arrangement of epithelium is that the distribution of the mucous glands varies correspondingly,—that is to say, whereas numerous branched glands are to be found over the cartilages of Wrisberg, the cushion of the epiglottis, and in the ventricles, yet on the posterior wall or interarytenoid fold, and especially on the true cords, the glands are extremely few in number. Hence, in any condition interfering with the sufficient moistening of the laryngeal surface, whether from some local fault or due to buccal respiration or atrophic rhinitis, we invariably find the posterior wall of the larynx and vocal cords most conspicuously suffering. These are the regions on which accumulate those small crusts of semi-inspissated mucus which not only interfere so often with voice-production,

but, from the irritation which they inflict upon the subjacent surface, induce one of the commonest forms of epithelial hypertrophy. But more of this presently. In the mean time I wish to indicate that we have in the larynx not only papillomata, which are found also on other mucous surfaces, but a form of epithelial hypertrophy which is more often met with on the pavement epithelium of the skin. It is as though the vocal cords were covered with skin rather than mucous membrane, and owe the moisture so essential to their elasticity and free vibration to the supply of mucus from the ventricles and adjacent mucous surfaces. And it is owing to the different structure of the epithelium in various parts of the larynx that we have such clinically distinct forms of hypertrophy as papilloma and the condition first described by Virchow as pachydermia, or by earlier writers as *chorditis tuberosa* (Turck) or *trachoma* of the cords (Morell Mackenzie). And besides these, of course, we have that most important of all epithelial hypertrophies, epithelioma.

The second reason why epithelial hypertrophy of the larynx is so peculiarly interesting is that we have such magnificent opportunities of studying the onset and progress of the two former affections both in the etiological and clinical aspects. Whereas with the latter,—viz., epithelioma,—if we have no greater opportunities of studying it in the larynx than elsewhere, we have yet the satisfaction of arguing that its early diagnosis and consequent prompt treatment are among the greatest victories of the laryngoscope, and alone are sufficient to justify the speciality.

Simple epithelial hypertrophy of the cords or interarytenoid wall is observed under various forms. The simplest, frequently not attended by any other manifestations of inflammatory action, is encountered most often in professional voice-users. Singer's *nodules*, which have for many years engaged the attention of laryngologists, are minute specks of epithelial hypertrophy situated upon opposite points of the free margins of the cords at about the point of junction of the anterior with the middle third of their length. They vary in size from such minuteness as to be perceptible only to the best of eyes to the size of a millet seed or larger. They are usually of the same color as the cord from which they spring, and, as the latter is often perfectly normal in appearance and devoid of color, the nodules may be described as partaking of the same pearly lustre, although, when large, they are somewhat more opaque. Rarely they are faintly pinkish. With such an appearance they can hardly be supposed to owe their presence to any lasting degree of inflammatory action.

But there are other marginal hypertrophies of the epithelium of the cords, usually occupying the same region, and also being symmetrically disposed. These are, however, accompanied by unmistakable evidence of a general process of chronic inflammation: the whole cord is thickened, more or less pinkish in color, and the margins rounded or thickened throughout their entire length. Occasionally the evidence of chronic inflammation may be even more pronounced, so that the whole length of the cord gradually swells inward to meet its fellow, the swelling culminating on the little epithelial excrescence to which I refer. Indeed, the point of distinction in the two cases consists in this, that whereas the definition in the former is so pronounced that the nodules are apparently neoplasmata independent of the surrounding surface from which they spring; in the latter they are but an exaggerated condition of a process which is affecting the whole length and breadth of the vocal cords.

And there is another curious etiological factor. The former sharply-defined excrescences are to be found solely, I believe, in singers, and chiefly in women. I am inclined to think that they are evidence of improper voice-production rather than of excessive use, seeing that we do not find them, so far as my experience instructs me, in singers of the very first rank. They are to be found most frequently in choir singers and amateurs, and in students of singing, perhaps, whose voices have not been properly *placed*, to use an expression of the singing master, better understood, we will hope, to himself than to the scientist. And it is surprising how often singing may be conducted with pleasure, to listener as well as to performer, in spite of such apparently serious obstacles. But the other class of marginal hypertrophies are encountered, for the most part, in voice-users still lower in the scale of artistic merit. That is to say, we find them, above all, in the elementary school-teachers, especially, I believe, in this country, where the numbers in class far exceed those to be found on the continent or in America, and among these teachers more peculiarly in those having charge of infant classes, and, *nota bene*, solely, or almost solely, among the women. Still descending the scale of artistic excellence, we find such marginal hypertrophies, accompanied by general thickening of the cords, in music-hall singers, in costermongers, and in screaming babies. I have seen several cases in the last class of music-producing individuals, and find them, above all others, the most difficult to cure, seeing that it is difficult to impress upon them the necessity of resting the voice,—the one condition absolutely essential to cure.

I believe that the determining factor in these cases is the excessive

use of the voice during inflammatory attacks, whether acute or chronic. To the teacher, the music-hall singer, the costermonger, and the baby, it is of minor consequence what sort of voice he produces so long as he makes himself heard, while, on the other hand, to the singer of high class, it is fatal to her reputation if she produce any sort of voice short of her best. Consequently, she seldom allows herself to encounter the risk inseparable from singing while suffering from laryngitis, and she is saved from the more formidable form of epithelial thickening on the margins of the cords. But with her, on the other hand, straining of the voice or faulty production would appear to favor the development of those sharply-defined growths to which I have referred.

The treatment of these marginal hypertrophies consists in absolute rest of the voice, and if this can be satisfactorily carried out, extending the period of rest over weeks and sometimes months, the great majority will recover without further treatment. Some cases, however, presumably when of too long standing, do not show any such tendency to cure, and I have not found local applications of any avail. This remark applies to the more sharply-defined growths without evidence of chronic laryngitis, and in these I have found careful operation perfectly successful. With an accurately fitting pair of Mackenzie's antero-posterior laryngeal forceps, with the larynx carefully cocaineized and fully illuminated, the minute nodule may be safely grasped and nipped off. But I would warn any hand but the most experienced against any such operation on a professional singer, as a hurried attempt may result in irretrievable destruction of the singing voice, and such operation ought never to be attempted until rest has been proved to be useless in causing absorption. In the teacher we need have less fear, and I have operated in such manner upon many cases of diffuse marginal hypertrophies with complete success. The costermonger's voice need scarcely engage our professional attention, nor, for that matter, need the howling child. The law may succeed better than the specialist in the one case, and the discreet nurse in the other.

But there is another form of epithelial hypertrophy, to which more especially Virchow drew our attention in his classic paper on the subject, and for which more especially the term pachydermia is reserved, I believe, by most laryngologists. It consists in a diffuse thickening of not only epithelium but mucous membrane proper over the vocal processes, and is invariably an accompaniment of chronic laryngitis, whether due to syphilis, alcoholism, excessive voice use, or ordinary inflammation. It often causes so little voice-disturbance, for reasons to be presently mentioned, that it is only when the patient presents

himself to the specialist after some acute exacerbation of the laryngitis that it is discovered, when it may erroneously be supposed to have supervened upon an ordinary acute attack. In this form it is confined to the male sex, though a still more diffuse form of epithelial hypertrophy is not infrequently met with in women as well as men. All diffuse kinds are essentially affections of adult life, and are said, I believe with justice, to be commonest between the ages of thirty-five and fifty-five. When confined to the posterior extremities of the cords, or indeed the vocal processes, the characteristic appearance is an antero-posterior swelling. Posteriorly it appears to lie above the level of the cord, while as it passes forward it assumes a lower level, becoming subglottic before it disappears in the general tumefaction which usually exists to a greater or less extent. The condition is usually bilateral, but may be unilateral. When on both sides there is a very characteristic difference invariably observed: the prominence is far more marked on one side and curiously fits into a corresponding depression on the other, so that during approximation of the cords the excrescences interlock in such a manner that they do not interfere materially with the proper contact of the vibrating margins of the cords; hence the voice is more affected by the co-existing chronic thickening of the cords than by the neoplasm in question. This locking of the thickened processes has given rise to much controversy. Virchow explains the pouch-like depression to the firm attachment existing between the mucous membrane in this region and the cartilage; but this is somewhat contradictory to the condition found on the opposite side. The explanation is probably only that of different degree of density in the thickening on the two sides, the one receding before the other in consequence of the mutual pressure.

The final form of simple epithelial hypertrophy as found in the larynx is even more diffuse than the last mentioned. It is usually a symptom of chronic alcoholism, although I have seen it in individuals who at most could be taxed with indiscretions in eating and drinking in general rather than with intemperance. They are fat, plethoric, and, in fact, exactly the temperament which I have described as being so often subject to a form of simple dry rhinitis. Indeed, I cannot help thinking that the whole trouble in these cases consists, in the first place, in an abnormal dryness of the laryngeal mucosa, and the consequent accumulation of inspissated mucus upon those regions in the larynx which are covered with pavement epithelium and ill supplied with mucous glands of their own,—*i.e.*, especially on the upper surface of the cords and interarytenoid fold. In such cases the accumula-

tion of semi-inspissated mucus is often so great that it is impossible to make a diagnosis until we have first washed away the accumulations with an alkaline spray. Having effected such a clearance, it then becomes abundantly clear that we have to deal with a hypertrophy mainly of epithelium, but probably also of all the elements of the mucous membrane covering the vocal cords and interarytenoid fold,—a hypertrophy so great, indeed, in some cases as to interfere considerably with the lumen of the glottis, to reduce the voice to the barest whisper, and, when the accumulation of dry scales of mucus clinging tightly to the skin-like vocal cords and posterior wall is considerable, to interfere with easy respiration. I have a case now under treatment where it is quite conceivable to me that if she had become much worse, if the enormous epithelial hypertrophy had advanced much further, a tracheotomy might actually have become necessary. But I have never heard or read of a case where such was required.

The appearances on examination with the laryngoscope are quite characteristic to one who has seen a case or two. But it is quite possible that, seeing the larynx alone and not the patient, one might mistake the opaque, white, prominent epithelial mass, encroaching upon the glottis from the posterior wall, for the pale-gray neoplasm occupying the same region and so often seen in the subject of tuberculous laryngitis. But the similar appearance of the cords, which, however, have often lost altogether their normal look, presenting to the glottis a convex border and so swollen as to appear to merge into the ventricular bands above, should prevent such an improbable blunder, no less than the dry condition of the whole of the laryngeal cavity. Indeed, there is no other affection in the least bit like this general hypertrophy of the pavement epithelium.

The treatment of these last two forms of pachydermia is by no means satisfactory, except in so far as we are able to improve the conditions which have induced the chronic inflammations, and give absolute rest to the voice. By some it is held that long courses of iodide of potassium are of service, but in my hands it has proved useless, except in one case where the origin of the co-existing chronic laryngitis was syphilitic. Astringents are equally useless. In one case I removed the epithelial hypertrophy covering the processus vocalis with cutting forceps without materially benefiting the voice, which subsequently appeared to owe its impairment to the co-existing chronic laryngitis and enfeeblement of tension. Nor would surgery appear to offer better results in that diffuse thickening of the pavement epithelium last described. The thickening in the interarytenoid fold is so

excessive that its removal, whether with cutting instruments or the electric cautery, would stand in danger of substituting very serious cicatrices. I am now treating the severe case I just described with electrolysis, and have some hopes of effecting considerable improvement, but at present it is too soon to speak of any result.

In a future lecture I will speak at greater length of the other forms of epithelial hypertrophy as seen in the laryngeal cavity.

CONGENITAL ATRESIA OF THE CANAL, AND MALFORMATION OF THE AURICLES.

CLINICAL LECTURE DELIVERED AT THE UNIVERSITY HOSPITAL.

BY B. ALEXANDER RANDALL, M.D.,

Clinical Professor of Otology in the University of Pennsylvania; Professor of Diseases of the Ear in the Philadelphia Polyclinic, etc.

GENTLEMEN,—The little patient that I now bring before you presents, as you see, very rudimentary crumpled auricles, of which the lobe alone approximates the normal aspect. The remainder of the external ear is hardly more than an irregular, gristly ridge, separated from the cheek by several dimples, none of which have any depth, or show any connection with the missing external auditory canal. The case was brought before you some eight or ten months ago, and at that time a bilateral operation was undertaken as an exploration for the freeing of the auditory canals, if present; but still more in an effort to restore the distorted helix of each ear to a nearer approach to the normal, in the hope that the very imperfect result would be improved upon by nature, and the ears, instead of remaining unchanged in size and aspect, would grow with normal rapidity, ceasing to be quite the deformity that they at first were.

Incision in front of the crumpled auricular cartilage set this free from its connection with the cheek, and permitted me, by transplantation of a broad flap from the cheek, to place this in a somewhat more normal position. Cicatrization has, however, undone much that was then accomplished, and the condition is not far better than when first seen. Growth has unquestionably taken place, and there is a prospect of further growth to-day on the left side, where our exploration proved the presence of at least a partial external auditory canal. Yet I shall now repeat my last operation, both to improve further the appearance of the auricle and to free more satisfactorily this occluded external meatus. Incision shows at once that the canal cavity which I previously found and opened has remained open, except at its exit, where

the minute orifice was practically invisible. Within it we now find ceruminous material, which has collected there since he was withdrawn from observation at the time of the healing of the previous operation. While there then seemed to be a bony auditory canal with which this communicated, the deeper portion of this has again closed, and it hardly seems wise now to attempt to reopen it. These conditions of congenital closure of the auditory canal are very unsatisfactory in the results which they furnish to operative intervention; and when the bony canal is lacking, it would be useless as well as dangerous to try to make a new canal, by reason of the frequent lack of anything like a normal tympanic cavity. Hearing is frequently present, and some-

FIG. 1.



Congenitally deformed auricle with impervious canal.

times wonderfully good in these cases, partly because sound vibrations are transmitted through the head to the closed tympanic cavities. This can be readily appreciated, as any one in the room will find that my ordinary voice is easily heard in spite of the tightest closure of your external canals with your fingers. We further find in many of these cases that patency of the Eustachian tube so far takes the place of an open external canal, that through the nose the patient is able to hear with remarkable success. Such a case, brought to the clinic a couple of years ago, had been explored by Professor Ashhurst shortly after birth, and the bony external meatus proved to be wholly

lacking, as on the right side in our case. Yet the boy had found it possible to go to public school with children of a like age, and, while needing to sit well to the front, was able, when his nose was not stopped up, to hear without difficulty all that went on in the school-room. Close his nose and mouth, and a loud voice must be used to make the sounds audible to him. So with our little patient.

We find here evidence of the perception of sound and, so far as his age permits, a comprehension of what is said to him; and we have reason to hope, in spite of the lack of any auditory canal on the right side, and even if we forego the completion of the auditory canal on the left, that he will in the future have better hearing, such as will enable him to move in his chosen walk of life. Most important, therefore, so far as the operation of to-day is concerned, is the relief of the deformity by the present amelioration of the appearance of the external ear, and the placing of the appendage in condition to undergo a normal growth. I have, therefore, dissected up the incurved helix, detaching it from the cheek; and taking a flap from the mastoid behind, I have covered in this narrow surface, stitching the anterior edge of my flap to the posterior margin of the external canal. The closure of the bared mastoid surface by sutures draws the auricle up and back into a more normal position, and will tend, I trust, in the healing process, to obviate the loss which took place after the former operation; since contraction will rather increase the effect of our operation, instead of rendering it nugatory, as it previously did. The external part of the auditory canal being thus made open and free, it will be an easier matter, if thought desirable, at some future time to reopen this down to the drum-head, if it should prove to reach so far, and to endeavor thus to gain a free passage for vibrations to the tympanic structures. Through the narrow canal which I was able to secure at my previous operation I was unable to see, or by the probe certainly to discern, whether the drum membrane was present at the bottom of the meatus. Now the canal certainly does not reach more than half-way to the tympanic cavity.

Besides these cases of congenital occlusion, there are not infrequent instances of an acquired atresia, one of which, approximating the conditions which I hope to relieve in this case, may be mentioned as bearing on the possibility of the case before us. The child was delivered by forceps during the uræmic convulsions of the mother, and the auricle was torn from the head by reason of their hasty application. The condition of the mother was so serious that the lesion was hardly noticed until the following day. Replacing of the auricle and

tamponing of the meatus seemed to give pain, and the child's cries disturbed the ill mother, so that the tampon was withdrawn and all treatment which seemed to irritate the child neglected. As a result, I found thirteen years afterwards that the meatus was closed just within the tragus, and a minute fistule was present, from which a drop of pus occasionally exuded. This greenish pus was constantly finding its way into the pharynx, as well as escaping externally, an evidence that suppuration was still active in the tympanic cavity. An incision was made along the anterior wall of the meatus, making a flap which was pressed backward to form the posterior wall of the canal, and a tube inserted as a tampon to maintain patency of the meatus, which was thus freely opened down to the perforated tympanic membrane. Suppuration soon ceased under proper treatment, and the patient was discharged with a dry perforation still present in the drum-head, a free canal, which several months afterwards showed no further tendency to narrow, and with hearing which was perfectly normal. The existence of so normal a tympanum as this, despite its suppuration, is wholly problematical in the case before us; yet, if present, it can probably be reached by a similar operation carried on more successfully and satisfactorily at a later period of life. In the attempt to restore the auricle in these cases we are limited greatly by the amount of cartilaginous material which is present; for any effort to enlarge the auricle beyond the amount of cartilaginous framework which we can obtain for it, is sure to prove wholly useless. A short time will serve to obliterate the most perfect plastic result if it lacks a cartilaginous basis. Our purpose is, therefore, rather to open a way for nature to improve the auricle, by normal growth, than to attempt to effect this by any surgical procedure at the present time.

ACUTE OTITIS MEDIA, SIMPLE AND PURULENT.

CLINICAL LECTURE DELIVERED AT THE MINNESOTA STATE UNIVERSITY.

BY FRANK ALLPORT, M.D.,

Professor of Clinical Ophthalmology and Otology in the Minnesota State University, etc., Minneapolis, Minnesota.

GENTLEMEN,—The patient before us to-day is a young man, fifteen years of age, in fair general health, who complains that two nights ago, when convalescing from an attack of influenza, he awoke with a severe pain in his ear. His mother placed a hot onion in his meatus and dropped into his ear some laudanum and sweet oil, both of which are time-honored domestic remedies for an "earache." The pain subsided during the day, but recurred again at night, when the mother once more resorted to the same treatment, but not with the former happy result. The pain continued during the night, and was accompanied by fever, tinnitus, and deafness. These symptoms have continued up to the present time.

Upon examination we find the auricle quite tender to the touch, and the meatus somewhat swollen and inflamed. Let us introduce the speculum and ascertain the condition of the tympanic membrane. He shrinks at the introduction. The parts are tender, but by gently rotating and pushing the instrument it is soon in place, and we are enabled to inspect the drum-head, which is found to be very much reddened, especially in the lower posterior quadrant. At this point a bulging is noticed, as if an abscess was pointing, which is probably the case. Purulent deposits in this location must receive the same treatment as in other locations,—viz., they must be liberated. Consequently, after gentle antiseptic irrigation, we drop into the ear a twenty-per-cent. solution of cocaine to somewhat mitigate the severity of the operation, and then, with an ordinary V. Graefe cataract knife, we incise the membrane at the most prominent part. The pain is not severe, but momentary, and pus is discharged through the opening. The ear is gently inflated and irrigated with antiseptic hot water. A

pledget of cotton is placed in the meatus, and he will receive the instructions for after-treatment which will be elucidated later in this lecture.

These are serious cases when we consider the topographical relations of the confined space which is the seat of inflammation and the important—I may say vital—structures surrounding the tympanic cavity on all sides. The brain, mastoid cells, cerebral veins and sinuses, jugular vein, carotid artery, and other structures of equal importance, are in dangerous proximity, and so it becomes imperative that inflammation of this location be regarded with due deference. This is accentuated when we consider Barr's statistics, showing the deaths in London from otitic brain abscesses, in one year, to be eighty-six. Barker considers fifty per cent. of all cases of brain abscess to be due to otorrhœa. Whether such complications arise from acute or chronic otorrhœa is immaterial at this juncture. All chronic otorrhœas arise from acute forms, and it therefore is most essential that the disease be recognized, properly treated, and cured before it becomes chronic.

Most authors distinguish between what is called "acute catarrhal otitis media" and "acute purulent otorrhœa." Such a nomenclature corresponds to a division of any acute inflammatory disease, such as scarlet fever, measles, and rheumatism, into different diseases according to their different stages. Every case of acute purulent otorrhœa must pass through the period called acute catarrhal otitis media before it becomes established as a purulent otorrhœa. One is simply an abortion of the other. Consequently, while admitting the advisability of indicating a purulent condition by name for purposes of convenience, it would appear inadvisable to classify a plurality of diseases, especially as no therapeutical differentiations are indicated. The disease should be called "acute otitis media," and for purposes of convenience in writing or speaking the term "acute *purulent* otitis media" may be utilized; but it should be remembered that the diseases are identical, and thus avoid confusion in the minds of both students and practitioners.

The causes producing acute otitis media are numerous, and may be from within or without, constitutional or reflex.

Any nasal or pharyngeal inflammation may extend through the Eustachian tube to the middle ear and establish an otitis. Consequently, when an individual "catches cold," as it is called, a tympanic inflammation is among the possibilities. Thus we find a large number of etiological factors, such as pharyngitis, tonsillitis, rhinitis, etc.,

—in short, any inflammation involving nose and throat tissue. The common practice of cleansing the nasal passages with the nasal douche, fluid snuffed from the hand, or even strong and vigorous sprays, often evolves an acute otitis by irritation or the entrance of the injected fluid into the Eustachian tube. The use of the Eustachian catheter, especially when utilized as a vehicle for the transmission of fluids, is often followed by inflammatory reaction, and the energetic use of Valsalva's or Politzer's inflation is not without risk; the same is true of injudicious suction from the meatus.

Of course, all operations or manipulations of the nose, throat, or ear are liable to be followed by inflammatory reaction in the tympanum. Gelli notices acute otitis media frequently following plugging of the posterior nares for epistaxis, and the same has been recorded by other observers.

Inflammation may extend from the meatus to the drum-head and middle ear, instigated by anything producing meatal inflammation, such as disease, operations, blows, or penetrating wounds. Surf-bathing is a frequent cause of otitis, not only from the entrance into the meatus of active water, but also from the forcing of salt-water into the Eustachian tubes and tympanum, and from the sudden chilling of the body incidental to open-air bathing. These remarks may also be applied, in mitigated form, to still-water bathing. Burnett says that "it is undoubtedly true that no mammal but man goes voluntarily under water without being provided with a means of preventing the water from running into his ears. It is a fact well known to many that hunting dogs, taught to dive, become deaf."

Among the constitutional causes of otitis may be enumerated any acute febrile condition, such as typhoid, pneumonia, diphtheria, erysipelas, etc., but more especially the youthful exanthemata, and whooping-cough and mumps. Scrofula and syphilis must not be forgotten, and tuberculosis is a prominent etiological factor, for Nathan, Eschle, and others have examined the discharge from cases of acute purulent otitis media and frequently found therein the bacilli of tuberculosis.

In this connection the epidemic called "la grippe" or influenza plays an important factor, as otitic inflammation of great intensity are of frequent coincident occurrence. No other disease with which I am acquainted produces so many instances of acute otitis media, of sudden invasion, great violence, and unfortunate results.

And, lastly, the principal reflex cause of otitis may be briefly attributed to diseases of the teeth and gums, but more especially to that physiological event classified under the term "teething."

Some years ago Knapp compiled some statistics relative to the causes of acute otitis media in the climate of New York City. They are as follows :

	Cases.
Pharyngitis	68
Coryza	48
Sea-bathing	16
Scarlet fever	18
Diphtheria	4
Measles	3
Pneumonia	8
Nasal douche	8
Cold water and alcohol in ear	2
Eczema of external meatus	1
Mumps	1
Varioloid	1

He also found that the disease occurred most frequently between the time of birth and five years of age, and in the months of January and February. Time has not materially altered the accuracy of these compilations. Undoubtedly, what Knapp years ago called coryza we would to-day designate as influenza or "la grippe." Among other omissions in these statistics is that of typhoid fever, for there can be no question that acute otitis media is often produced from this disease. Bezold finds that four per cent. of all cases of typhoid result in otitis in the third or fourth week, and that the initial symptoms are generally quite intense and frequently followed by marked mastoid manifestations. He thinks it may be due,—

1. To an extension of inflammation from the naso-pharynx to the tympanum.
2. To the proportion of septic matter from the naso-pharynx to the tympanum ; or
3. To embolism of vessels ramifying in the mucous membrane of the tympanum, either due to endocarditis and thrombi from the left ventricle or to peripheric purulent foci.

Dr. Robert Barclay (*Medical Fortnightly*, March 1, 1893) states that the principal aural lesions of typhoid fever discoverable at the autopsy are as follows : Closure of the Eustachian tube, with catarrh of the fauces ; catarrhal otitis media, with profuse secretion ; congestion of the mucous membrane of the middle ear, in all its phases and with all its consequences,—perforation of the drum-head, dislocation or disintegration of the ossicles, inflammation of the cells of the mastoid process, facial paralysis, extension of the inflammation to the encephalon ; parotitis with rupture into the external auditory canal ;

hyperæmia of the internal ear; ecchymosis in the vestibule and lower part of the cochlea, but not in the semicircular canals, with ecchymosis in the tympanum and osseous Eustachian tube; destructive hemorrhage in the labyrinth, internal auditory canal, and deeper-lying parts; infiltration of utricle, saccule, ampullæ, membranous lamina spiralis, and, exceptionally, the semicircular canals and the zona ossea of the labyrinth; suppurative otitis interna.

What does a physical examination of cases of acute otitis media reveal? If the etiological factor proceeds from without, evidences of the exciting causes will be manifested by the swollen, inflamed, and, perhaps, lacerated meatal tissue, with, possibly, a forcibly ruptured drum-head.

If the cause proceeds from within, more or less inflammation of nasal or pharyngeal tissues, or both, extending up the Eustachian tube to the tympanum, will be observed. The latter condition may be diagnosed by means of the catheter, air-bag, and otoscope, which will indicate a tube of somewhat narrowed calibre and the characteristic bubbling incident to the presence of fluid in the tube or tympanum. Inflation of any kind is usually painful, and so is pressure upon the auricle, especially at the tragus and concha. The tissues of the meatus are also tender, and this often renders the introduction of the speculum exceedingly unpleasant to the patient; consequently, an instrument of small size should be used, which must be rotated gently (not pushed) into position. The tympanic membrane will be found more or less inflamed. Sometimes, at the commencement of the case, this congestion will be seen merely at the handle of the malleus, while at the height of the disease the entire membrane is intensely reddened. The most prevalent seat of congestion is the lower inferior quadrant, owing to its dependent position, while an attic inflammation is indicated by redness in Schrapnell's membrane. But, wherever the inflammation may be, it is here we must anticipate the subsequent bulging or pointing significant of the presence of pus, which, if not drained through the Eustachian tube (a rare occurrence), will be evacuated through an opening in the tympanic membrane.

Fever is generally present, especially in children, in whom it is apt to be intense and transient. Chills, delirium, and great general prostration may be observed. The tongue is coated, and an appearance of apprehension and a fear to move the head is sometimes quite noticeable, especially if the inflammation has already invaded the mastoid cells, which may occur quite rapidly.

In young children we are dependent upon objective symptoms for

diagnostic purposes, and must watch for febrile manifestations, sharp cries of pain, a persistency in throwing the hands towards the ear, and a reddened drum-head; but in adults, helpful subjective symptoms will quickly aid us in diagnosis. These symptoms, although tolerably constant in character, will naturally vary in intensity according to the degree of inflammation, and are usually especially marked in instances following an attack of influenza.

The first indication is generally a feeling of fulness, dulness, bubbling, and deafness of the ear, emphasized by motions of the jaw or head. Pain usually commences at night, and the first day will frequently bring relief, but subsequently the suffering is more or less constant, day and night, until relief is afforded by an evacuation of pus. Pain may be confined to the ear, or radiate in all directions; it is intense, and aggravated by motion, sneezing, coughing, straining, etc. The patient often hears his own voice apparently muffled, as if talking with his head in a barrel. The symptoms increase in severity and constancy, until pus is evacuated, either naturally or artificially. The former takes from a few hours to three or four days, and is usually followed by almost immediate relief. The discharge may cease in a few days, but generally continues for from two to four weeks, and requires careful attention until complete healing of the tympanum and its membrane has occurred. An ideal result, however, is not always obtained: the pain does not always cease, but may continue or increase, especially if the inflammation has extended through the tympanic foramina into the mastoid cells, or attacked the periosteum outside the mastoid process, and established a periostitis.

Among other complications liable to occur are meningitis, optic neuritis, paralysis, cerebral abscesses, phlebitis and thrombosis of the cerebral veins and sinuses, carotid hemorrhage, erysipelas, etc. This subject is so broad and extensive that nothing will here be said about it. I have treated the entire matter in a series of articles in the *Journal of the American Medical Association*, commencing October 15, 1892. If the case does not progress favorably any of these conditions may occur in the acuteness of the disease, or necrosis of the bony walls of the tympanum or ossicles may supervene, with destructive sloughing of the drum-head and the formation of polypi or granulations, and the case settle down into one of those unfortunate instances of chronic purulent otitis media, with all the disastrous consequences incident to this condition.

We now arrive at a consideration of the treatment of these cases, and the abortive plan is, naturally, the first to claim our attention.

If abortion can be produced without pus-formation we may indulge in congratulations, but this only becomes possible when the treatment is commenced in the primary stages of the disease, and even then supuration usually occurs.

With Politzer's bag and otoscope the condition of the Eustachian tube should be ascertained. If closed or narrowed, it should be opened by Politzerization, or, if this proves insufficient, by the cautious and gentle use of the catheter, which may be repeated daily during the course of the disease. The patient should remain quietly at home, in a warm, well-ventilated room, with bowels and kidneys moderately active, and on rather a low diet. Leeches, either natural or artificial, should be applied close to the tragus, because at this point a direct depletion of the venous supply of the drum-head may be effected, as the veins from the tympanic membrane pass along the superior anterior wall of the meatus, and empty into the anterior facial vein just in front of the tragus. Politzer says that "bleeding in this locality will also effect a depletion of the venous net-work situated in the cavity of the maxillary joint and its neighborhood, the importance of which was first pointed out by Zuckerhandl; the supply of blood in the vessels of the tympanic cavity, which are in communication with these vessels, being thus lessened."

Stimulants and tobacco should be forbidden. As an anodyne, antiphlogistic ear-lotion, some authors recommend atropia, and others cocaine. I have been pleased with a combination of both, and write the following prescription :

R Atrop. sulph., gr. v ;
10-per-cent. sol. cocaine,
Bichlo. sol., 1 : 10,000, aa ℥ss.

Drop in the ear every three hours, day and night. It should be thoroughly warmed before using, and five or six drops are sufficient for each instillation. It must only be used on an intact drum-head, as it would be manifestly improper to apply it to a perforated membrane for fear of constitutional symptoms.

Hot applications to the auricle are grateful, and are best applied by hot bags of meal, bran, hops, salt, etc. Hot water, injected through a fountain douche, is inadvisable in the initial stages, even if used gently, whereas it is always applied with some force and may prove harmful. If hot water is deemed advisable in this stage, it is better to have the patient lie down with the affected ear uppermost, and fill the ear with hot water from a spoon. When it ceases to be hot, it may be

replaced with fresh hot water, etc. It is wise to apply a hot bag over the auricle after the water is poured in, as it assists in keeping it warm.

Concerning internal medication, I have had excellent results from five grains of phenacetin and two grains of salol, administered every three hours. In addition, I give the one-half strength rhinitis tablets prepared by Fraser. They contain camphor, grain $\frac{1}{4}$, belladonna (fluid extract), grain $\frac{1}{8}$, quinia sulphate, grain $\frac{1}{4}$, to each tablet, and I give one every hour.

Aconite, in small and frequently-repeated doses, has appeared to yield good results. Some years ago, Sexton, of New York, claimed extravagant results from the administration of sulphide of calcium, gelsemium, and pulsatilla, but it must be admitted that the digested consensus of professional opinion has not substantiated his views.

Quinine in large doses should not be given, as it increases aural congestion.

The throat and nose should be carefully examined, and will usually require treatment. In a general way, without desiring to be specific, or to exclude exact and proper treatment, I will say that I like to treat the throat in these cases with a gargle of a hot, watery solution of bicarbonate of soda, frequently repeated, and the nose with warm and frequent sprays of Dobell's solution or Seiler's tablets.

If abortion of the inflammation proves impossible, the question of a paracentesis must be settled,—whether or not to perform it, and, if so, when and how. Opinions differ on all these points, but I have been satisfied by pursuing the following plan: The membrane, tympanum, pain, fever, etc., must receive daily observation, and if membranous congestion and constitutional symptoms are not aggravated in character, but tend towards improvement after three or four days, a paracentesis may be omitted. If, on the contrary, the reverse conditions obtain, especially when accompanied with pointing or bulging of the drum-head, a paracentesis should be unquestionably and promptly performed. The bulging point should be a guide for the incision; still, if it can be made in the lower inferior quadrant it is best, owing to the dependent position of the parts. It should be done easily and gently, and it is well to extend the incision down to the floor of the tympanum to facilitate drainage. For some years I have been accustomed to incise the drum-head at Schrapnell's membrane, where much congestion obtains at this point, even if another incision has been in the lower half of the membrane. I particularly dread attic inflammations, and have seen many instances of multiple tympanic

abscesses where the second pus centre was at this point, and was not relieved by opening the lower half of the tympanum.

The operation should be preceded by antiseptic douching and cleansing of the meatus and a thorough application of a twenty-per-cent. solution of cocaine to the drum-head, and is best performed with the patient sitting upright in a chair, with the head firmly supported by a standing friend or attendant. I employ a V. Graefe cataract knife, rather than a bent-handled knife, as it can be manipulated better and is usually sharper. After operating, the middle ear should be inflated and the parts gently douched with a warm, antiseptic solution.

The quiet, repose, internal medication, etc., should be continued as before the operation, and may be gradually dropped as the disease improves. The solution of atropia and cocaine must, of course, be discontinued. The ear must now be thoroughly and regularly cleansed with the fountain douche and a hot, antiseptic solution, and this will usually be sufficient to effect a cure inside of a month. Active interference is usually meddlesome and harmful. The insufflation of powders in acute purulent otitis media is exceedingly detrimental, and many instances of mastoid and brain abscesses, etc., have been instigated by thus blocking up the meatus and preventing the proper egress of pus. When the disease becomes chronic such medication is doubtless beneficial, but must be avoided in the acute stages.

But these cases do not always progress to a cure, as previously indicated. The acute symptoms may not subside; the pain and constitutional symptoms may remain unabated or increase in severity. Under such circumstances the probability is that some of the important structures already mentioned, such as the mastoid process, brain, veins, or sinuses, have become implicated, in which event measures must be resorted to which it is beyond the scope of this lecture to discuss.

Dermatology.

ALOPECIA; ALOPECIA CIRCUMSCRIPTA.

CLINICAL LECTURE DELIVERED AT THE MEDICO-CHIRURGICAL HOSPITAL OF
PHILADELPHIA.

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ALOPECIA.

GENTLEMEN,—Our first case is that of a man who complains of thinning of the hair. He is twenty-seven years of age, and it is two years since he first observed that in making his toilet an abundance of hairs were brought away by the comb and brush. For awhile he scarcely paid any attention to this fact. As time wore on, however, his acquaintances began to remark that he was acquiring a “high forehead,” and he then became conscious that his hair had thinned considerably in front and at the sides, leaving exposed a surface which had formerly been covered. Then, or at a somewhat later period, he became aware that upon the top of the head the hair was growing thin. As he used the brush he could perceive the skin of the scalp of a reddish tinge in contrast with its darker covering.

The progress of the affection has been very slow, and the condition to-day, he assures us, scarcely differs from that of a year ago. You perceive at a glance that, although the vertex is but scantily covered, it is not absolutely bald. The retreat of the hair from the forehead in front and at the sides, above and a little in advance of the temple, is well marked and is characteristic of the early stage of alopecia, often making its appearance prior to any decided thinning upon the vertex. You will see, also, if you look closely, that the bare spots above the forehead and temples present a smooth, polished, shiny, and, withal, a slightly greasy aspect.

The patient informs me that his hair was never very thick; that it was of rather fine and silky texture and grew rapidly in length. His

general habits as regards his person are cleanly. He states that he had always, as far as he knew how, taken care of his hair. He had sometimes been shampooed at the barber's, and when he bathed he had been in the habit of lathering his head plentifully with soap and water. The latter observance, indeed, he had practised the more assiduously as he had been troubled from an early period by an excess of dandruff. He remembers that as a lad his shoulders were generally more or less powdered by flakes which had fallen from the head.

Realizing that he was threatened with permanent and premature baldness, the man has of late been particularly solicitous as regards the toilet of his scalp, and has had recourse to various nostrums which he has heard recommended. No benefit has, however, resulted, and, finally, in despair, he has sought advice at this clinic. His sole thought now is, how to save the sparse head-covering which he has left.

The local trouble is the only thing of which this man complains. He regards himself as a perfectly healthy man, is busily engaged as a salesman, and pursues his avocation day after day without fail. He has not, all told, lost more than a week's time from illness in the last ten years. He has never, in fact, suffered from any serious ailment since his early childhood. His appetite is good, his digestion has never given him any trouble, his bowels are regular, he sleeps well. He asserts that he has never had any form of venereal disease.

This is an excellent and, indeed, almost exceptional physical history. I must, however, in order to complete the picture, point to its adverse side. Despite the fact that the man was never ill, he is certainly not robust. His frame is slender and his general muscular system is ill developed. He is rather pale though not decidedly anæmic. He possesses a fair measure of activity and endurance, but not much actual physical strength. The man is, in fact, a fair type of a class abundant in our American and, particularly, Eastern cities, a man city-born and bred, set early to work at a pursuit requiring brain rather than brawn, and which is carried on principally within doors.

Having thus brought out, with sufficient detail, the chief local and general facts of the case, and premising that there can be no question here of the diagnosis of alopecia, but only of its cause, I pass on to study the second case, which, though also characterized by loss of hair, presents an entirely different appearance and has an entirely different history.

ALOPECIA CIRCUMSCRIPTA.

The first point of contrast you see at a glance: our second patient is a little girl. As she is led in by her mother you perceive that there

are certain patches of baldness upon her head. Annie B. is twelve years old, she is a delicate-looking little creature, rather small for her age. She enters the room timidly, and the mother tells me that the child is excessively nervous. She is of a lively disposition, but has recently been subject to night-terrors. She will awake screaming loudly from some terrible dream, and will have to be taken into her mother's bed before she can be appeased. At times during the day, also, she has been so agitated that the mother feared she was about to fall a victim to St. Vitus's dance. Recently the child has become very emotional, has suffered much from headache, and has had epileptiform convulsions. Altogether, Annie illustrates exactly the neurotic constitution. She is of Irish parentage and inherits the *perfervidum ingenium* of the Celtic race.

Having observed these peculiarities of the child's constitution and general condition, let us proceed to inspect the lesions upon the head. There are three spots of baldness, one being situated upon the vertex, and one upon each side, at points nearly corresponding to the position of the parietal eminences. The lesions did not make their appearance at the same time, but one after another after varying intervals. The first has been in existence for about a year, and the last for about two months. The disease began upon the crown of the head. The patch upon the right side developed about six months ago. The loss of hair was, in each instance, sudden. Upon the first occasion it occurred over night, while the second and third patches were fully established within a few days. The bare spots are of a nearly circular outline. The one upon the vertex is the largest, being about two inches in diameter, that upon the right side measures an inch, and that upon the left half an inch in diameter. The size of the spots has varied very little since their first appearance. The exposed surface is slightly pale and smooth. It is somewhat less sensitive than normal. The disease of the scalp has been attended by slight itching.

These cases are examples of two varieties of baldness,—alopecia and alopecia circumscripta or areata, or baldness in spots. The former is vastly more common than the latter, and the two affections, though resembling each other as regards loss of hair, yet differ from each other in certain particulars.

I need say nothing concerning the diagnosis of alopecia. The bare poll tells its own story. Baldness is subdivided into several forms, as respects its rapidity and period of development. General baldness may be acute or chronic in its progress. In the former variety the loss occurs within a few weeks or months. It may or may not be

accompanied by gross morbid changes in the skin. In the beginning of the chronic variety the fallen hairs are replaced by others which exhibit signs of failing nutrition in the diminution of their length and thickness. This fact is not usually noticed by male patients, but it attracts the attention of women. With the progress of time the hairs, while becoming less abundant, grow gradually thinner and shorter, until complete baldness is established. Chronic baldness begins most often upon the vertex, like a tonsure, but its first manifestation is very commonly above the forehead and temples, as in the case of the present patient. The hairs themselves, when plucked from a spot upon which they are thinning, generally show alteration, either to naked-eye inspection or upon examination under a lens. Their free ends are apt to be split and curled up, the bulb seems more or less shrunken, and the shaft may be brittle and easily broken. The remaining hair of the head is very commonly affected in its nutrition, especially after the baldness has been for some time fully developed. Its growth in length is curtailed, and when it has attained its limit the ends look rough, and present what the barbers call a "ragged" appearance.

From the operation of various causes baldness is often developed during early adult life. Premature baldness may be either of the acute or chronic form. It often begins between the twenty-fifth and thirtieth year, though an earlier origin is by no means uncommon. Occurring late in life, senile alopecia is but one of many indications of declining nutritive power, and as such is accepted with resignation. Not so in youth, however, or even early middle age. Premature baldness is universally regarded as an affliction. To many persons it is a source of actual distress and mortification. It behooves us, therefore, to acquaint ourselves with its causes, the methods by which we may arrest its progress, and by which we may promote a reproduction of hair.

The causes of baldness are numerous. They are both local and constitutional. If the composition of the blood is changed under the influence of acute or chronic illness, the nutrition of the hair must be impaired as well as that of other parts of the body. If the nervous supply of the scalp be disturbed, the normal growth of the hair must suffer interference. We, consequently, observe that eruptive fevers, the puerperal condition, syphilis, anæmia, chlorosis, rheumatism, gout, scrofula, diabetes, and other serious constitutional disease, chronic digestive disturbances, prolonged anxiety, or excessive brain-work, loss of sleep, irregular habits of life, etc., are general causes of alopecia. Different diseases of the scalp affect the nutrition of the hair-bulbs in such a manner as to produce baldness. Dry seborrhœa is one

of the commonest local causes. It gives rise to an accumulation of dry and rather greasy scales, the follicles are obstructed, mechanical impediments are offered to the local capillary circulation. In the course of time the follicles are obliterated, the corium is atrophied, and baldness is necessarily, in these conditions, permanent. The seborrhœic eczema of Unna acts in a similar manner. Whether these diseases of the scalp, which have much in common, are identical is a question which cannot be discussed at this time. Suffice it to say that one or the other is responsible for most cases of alopecia not dependent upon constitutional causes. Other skin-diseases located upon the scalp produce baldness in so far as they destroy the follicles. Eczema seldom occasions permanent loss of hair unless through the agency of an abscess which destroys hair-follicles along with other tissue. Lupus of both forms, when it attacks the scalp, causes permanent loss of hair. Favus, ringworm, herpes zoster may have the same effect, but their lesions are circumscribed, and will be alluded to in connection with the case of the little girl. Other rarer maladies are capable of destroying hair-growth, but practically scarcely enter into the question of etiology. Among local causes, other than disease which lead to baldness, I must not neglect to mention the use of hair-dyes, powders, and pomades, irritant lotions and oils, excessive combing and brushing, the habit of keeping the head constantly covered, the wearing of stiff hats, the too frequent use of water, especially of soapy water, upon the scalp, and of shower-baths. Thus you perceive that some of the very means used in the toilet of the scalp may be a source of harm.

Before entering upon the subject of the treatment of the present case I will say a few words in reference to the proper care of the hair and scalp. The use of an animal or vegetable oil promotes the nutrition of the hair. The scalp needs to be cleaned with soap and water at stated intervals, but an excess of soap is apt to irritate, and thus prove injurious. The brush should not be very stiff, and the comb should have large, blunt teeth. It is not advisable that the hair should be cut too closely or too often, and such a practice tends to cause premature falling of the hair. The dry shampoo, as performed by barbers, is of service in maintaining a healthy growth of the hair. The wet shampoo is advantageous, if not too frequently performed. It prevents the accumulation of dandruff scales. Once in two weeks is often enough to have this manipulation practised. An occasional "singeing" is also beneficial, more particularly if there is a tendency to falling of the hair. In singeing, the split and ragged ends are drawn out by means of a coarse-toothed comb and a lighted taper applied.

The dead end is destroyed, and the fire is extinguished as soon as it reaches the teeth of the comb.

The treatment of premature baldness depends closely upon the cause. If anæmia or aggravated indigestion be present, constitutional tonics and digestive ferments should be administered. Among drugs which I have found of special value may be mentioned *hoang-nan*, which has a stimulant and alterative effect upon the sudoriparous and, particularly, sebaceous glands. For this reason I prefer it to *nux vomica*. *Hoang-nan* may be given in the form of a fluid extract, the dose of which is from five to twenty or thirty minims, or a tincture, twenty to forty minims of which constitute the dose. If evidences of depressed nutrition of the nervous system exist, phosphorus or its derivatives, arsenic, iron or cod-liver oil are demanded. When the general system is at fault, the diet and the habits of the patient must be carefully regulated. Open air, sunlight, physical exercise, a nutritious and digestible food, early hours, temperance in all things, contribute to the restoration of the general health and improvement of capillary circulation of the scalp. *Pilocarpine hydrochlorate* appears to have a special influence in promoting the growth of the hair when given continuously in the dose of one-twelfth or one-sixth grain twice a day. Should salivation result, the remedy, of course, must be withdrawn. Another drug which improves the nutrition of the hair is sulphur, administered persistently in small doses,—as, *e.g.*, five grains three times a day. The sulphide of calcium is also recommended by some writers for the same purpose.

The circulation and innervation of the scalp, however, as the foundation of healthy hair-growth, need to be stimulated by local measures. Among these massage is of decided efficacy. It exerts, moreover, a beneficial influence upon the sebaceous glands, and is useful when *seborrhœa* is the cause of the baldness. A still more powerful agent which we may employ in order to arrest thinning of the hair is electricity. Both forms of this force have been used with good effect. If the continuous current be chosen, the first application should be weak, not exceeding, for instance, more than three or four milliamperes. It is applied by means of moistened sponge-electrodes, the hair also being moistened and parted here and there as the current passes. I am very much in the habit of applying the current through a brush furnished with metallic bristles, passing it slowly over the scalp until the skin is decidedly reddened. Faradism may be passed in the same way through a wire brush, the patient at the same time holding the moistened sponge-electrode.

To turn now to the medicinal means, ordinarily so called, I remark, that, in the first place, the accumulation of dandruff must be prevented by a sufficient but not excessive use of soap and water. If dandruff be permitted to remain upon the head it will eventually constitute, in itself, a source of disease, especially of *seborrhœa sicca*.

When the hair falls without decided change in its gross appearance or that of the scalp, local applications of a mildly stimulant character are of service. Good preparations consist of balsam of Peru, the tincture, or the compound tincture of benzoin. The balsam may be dissolved in dilute alcohol and applied as a lotion, or it may be rubbed up with a fatty base and used as an ointment. An excellent excipient is lanolin, the viscosity of which may be diminished by the thorough admixture of three parts with one part of benzoated lard. Quinine, its tannate or sulphate, and cinchonine or its sulphate, are also useful remedies made into ointments in the proportion of a drachm to the ounce, and agreeably flavored with the oil of bergamot, rose, or verbena. A solution of one drachm of chloral hydrate in one-half pint of dilute alcohol or Cologne water is a good preparation. A portion of the alcoholic fluid may, if desired, be replaced by glycerin. Alpha-naphthol, dissolved in weak alcohol, and an ointment containing a drachm of either alpha- or beta-naphthol, are efficacious applications. An ointment or alcoholic solution of resorcin, in the proportion of five or ten grains to the ounce, may be employed with good effect. An emulsion made by adding to the solution of resorcin olive oil, or expressed oil of sweet almonds, is sometimes to be preferred. A mixture of equal parts of ammoniated mercury ointment with cold cream or other mild unguent, may likewise be found of service. A shampoo, every week or two, with the tincture of green soap, either plain or diluted, answers a good purpose by cleaning or stimulating the scalp, and if, after a time, it prove too irritant, it may be employed less frequently. After using the green soap it must be washed away by means of a stream of warm water, and the hair thoroughly dried. When this has been accomplished we may resume the use of any of the ointments or lotions of which I have spoken.

When loss of hair is caused by *seborrhœa sicca* it is necessary in the first place to clear the scalp of crusts and scales. In order to effect this it is not essential that the hair should be cut, but the scalp should be thoroughly anointed with olive, linseed, or almond oil, after which the head is covered with a cap of flannel or oiled silk. The crusts loosen and come away within twelve to twenty-four

hours. I usually prefer to make use of the oil of ergot, which, in addition to cleaning the surface, is beneficial by virtue of its stimulant and astringent properties. This oil may, according to circumstances, be used alone or in combination. In some cases the addition of a small quantity of the oil of eucalyptus proves of advantage. In others it is mixed with equal quantities of glycerin, a fifty-per-cent. solution of boro-glyceride, oleic acid, or the fluid extract of mercury. The oleate of iron, also, sometimes proves a valuable addition. Any of these oleaginous preparations may be suitably perfumed.

When the scales have been detached, the principles of medication vary according as the exposed surface is pale, normal in color, or reddened by inflammatory engorgement. The first two conditions warrant the application of more or less stimulant remedies, while the last is benefited only by mild and sedative applications. The oil of ergot alone or combined may answer every purpose, but if the disease is advanced the scales form anew, and in this event the use of a chamomile- or sulphur-soap is required in order to cleanse the surface. An emulsion of the yolk of egg in lime-water is likewise of service. A more satisfactory detergent, however, is an infusion of soap-bark, or quillaia saponaria. The cold infusion may be kept on hand, and when needed a sufficient quantity of hot water may be added. The fluid is mopped upon the surface several times a day. A good rule to observe in the treatment of alopecia is to begin with mild applications whenever we have any doubt as to the degree of stimulation demanded. If well borne the strength may easily be increased. Among the substances used in solution are table-salt, carbonate of potassium, hamamelis, hydrochlorate of hydrastine, and corrosive sublimate. Carbolic acid is used in the proportion of a drachm to a pint of water; corrosive sublimate in the strength of two to five grains to an ounce. Ointments of corresponding strength may be employed instead of lotions. Tar, sulphur, tannic acid, and salicylic acid are also useful agents in the form of ointments. Alcoholic preparations, turpentine, and solution of ammonia are valuable in cases requiring brisk stimulation. Mercurous oleate is of value in similar cases, as is also an ointment of five or ten grains of thymol to the ounce of excipient. In very obstinate cases we may sometimes resort with advantage to powerful stimulants, such as veratrine ointment, capsicum, croton oil, and glacial acetic acid, etc. It is impossible to enumerate all the agents which have been, or may be, used in cases of baldness, but let me impress the cardinal principle upon your mind,—avoid over-action.

In the first case, it will be desirable for the man to obtain, if pos-

sible, more out-of-door exercise. He is cooped up too much within walls, and I think that his nervous system is kept upon too severe a strain. Notwithstanding his activity it will be well for him to take, during a good portion of his time, iron, quinine, and strychnine. In regard to local treatment, as his scalp is clean, and nearly normal in hue, a mild application will suffice. He shall be ordered a lotion composed of.—

R Hydrargyri chloridi corrosivi, gr. viii;
Glycerini, fʒss;
Spir. odorat., fʒviiss. M.

In addition to these measures the continuous electric current shall be applied to his scalp twice weekly by means of the brush. His disease is yet in an early stage, and if he faithfully follows out the mode of treatment indicated, the fall of hair will cease, and will in time be succeeded by a more vigorous growth.

The case of the little girl typically exemplifies the history and lesions of alopecia circumscripta. In such a case we have only to distinguish the disease from tinea trichophytina of the scalp, or ringworm, and from favus. Alopecia circumscripta is, however, more abrupt in its onset than ringworm. Its lesions are smooth and polished, free from hair and scales. The patches of ringworm are covered with fine scales and ragged hair-stumps. The yellow cup-shaped crusts of favus are distinctive and totally unlike the lesions of this case. Any doubt which may occasionally exist can be solved by the use of the microscope.

The etiology of circumscribed baldness is of interest. It frequently attacks children, though it may occur at any age. It usually manifests itself in connection with or as a sequence of some marked depression or disturbance of the nervous system. Recently it has been conjectured, especially by French writers, that, at least in some instances, alopecia circumscripta is due to parasitic agency. Epidemics of the disease have been observed in schools and barracks, and lend some probability to this view. It is, however, at present merely a theory, for no micro-organism has yet been discovered.

The prognosis of circumscribed baldness is generally good, especially in the case of a child. The local treatment consists in the use of those stimulating substances which I named when speaking of the management of generalized alopecia. The drugs must be cautiously used, of course, in accordance with the age of the patient. It is often of advantage to shave the bare spots when fine hairs appear above the surface. At such times, also, singeing answers a good purpose. Gal-

vanism has, in my experience, been of service. Constitutional remedies are required, and we must select those which exert a favorable influence upon the blood and nervous system. At times sedative remedies will be needed.

In the case now before us I shall advise that the child be withdrawn from school; that she spend a portion of every day, at least when the weather is not too inclement, in the open air, and, as far as possible, in the sunlight. Her diet must be liberal and at the same time simple. The use of general electricity every two or three days will be of benefit. Notwithstanding the threatening symptoms, I do not think that the child suffers from any organic disease of the nervous centres. The trouble is probably purely functional. With this idea I shall prescribe,—

R Sodii bromid., ʒiiss;
 Liq. potass. arsenit., fʒii;
 Syr. aurant. cort., fʒss;
 Aquæ, q.s. ad fʒiv. M. Ft. sol.
 Sig.—Teaspoonful three times a day.

If the bad dreams persist or the child suffers from sleeplessness, she may be given ten grains of chloralamide or five grains of trional before going to bed. Either of these substances is a good hypnotic, with little or no depressant effect and unattended by the drawbacks of opium. Locally, the following ointment shall be applied by friction several times a day:

R Thymol, gr. v;
 Resorcin, ʒi;
 Adipis benzoat, ʒvii. M. Ft. ungt.

A distinctive peculiarity of diseases of the skin is the mental distress which they excite. A man dreads to be bald before his time. Spots or patches of disease upon the skin cause acute mortification to sensitive people, above all to women. When the patients are too young themselves to experience annoyance on account of their appearance, the feeling is transferred to their parents. I am able to show you to-day patients of different ages who exemplify the truth of the foregoing remarks.

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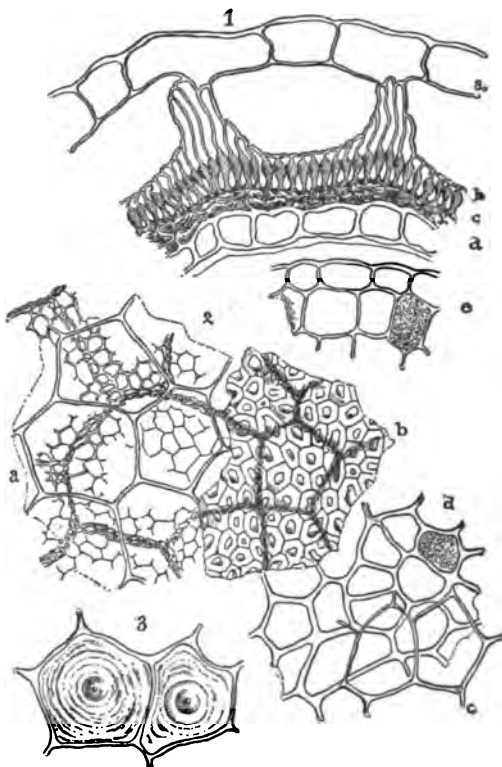
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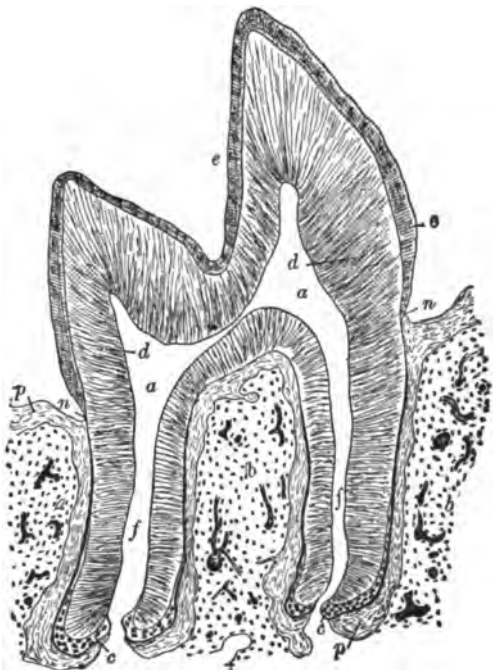
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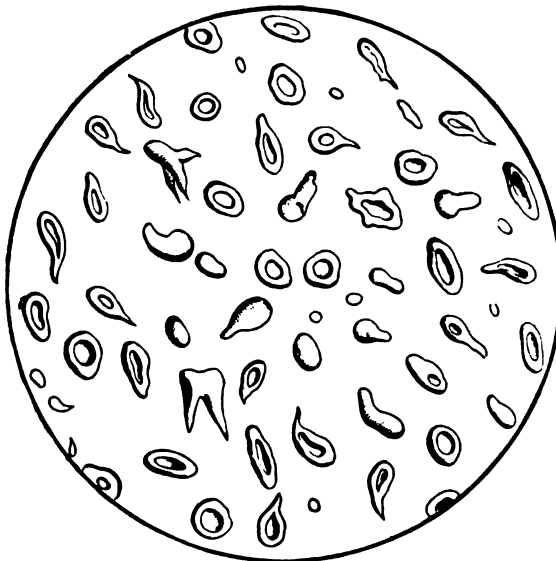
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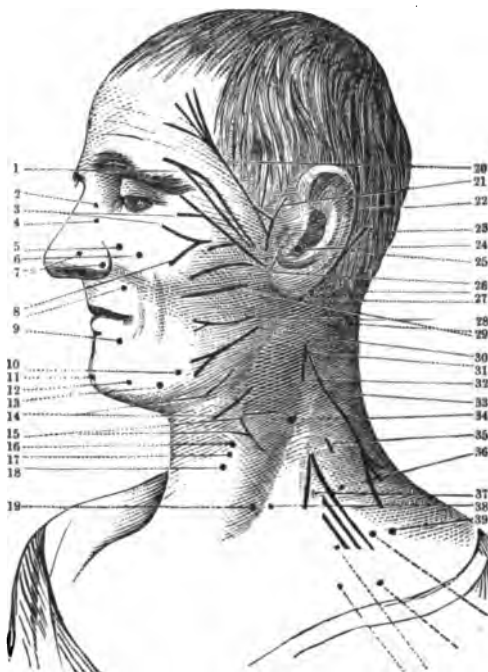
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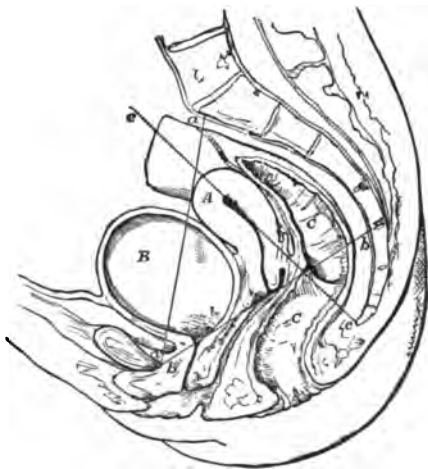
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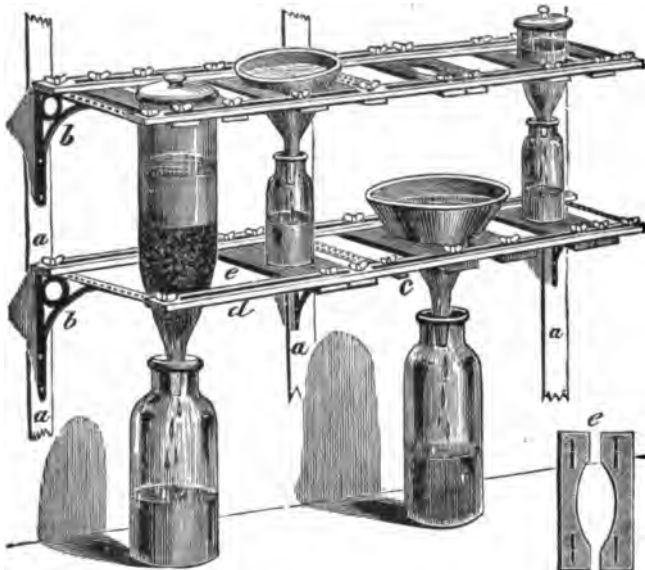
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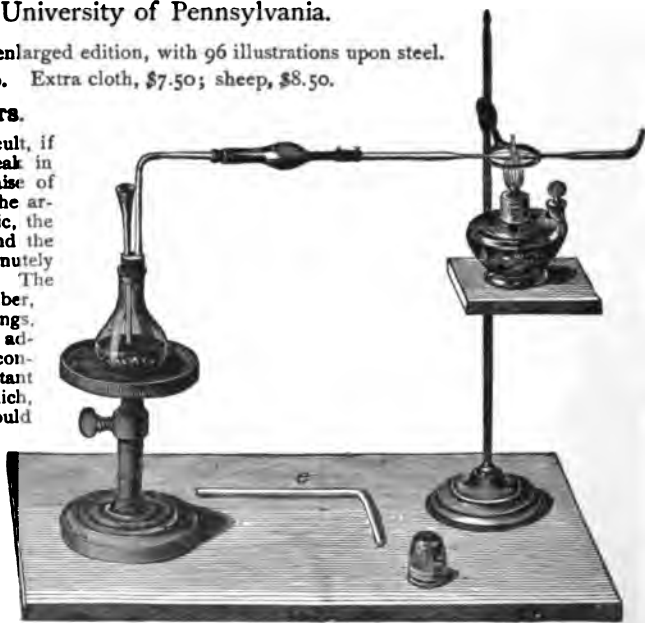
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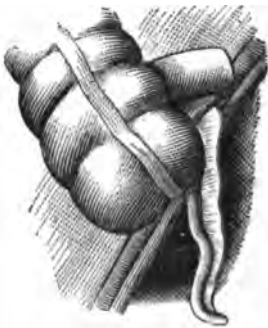
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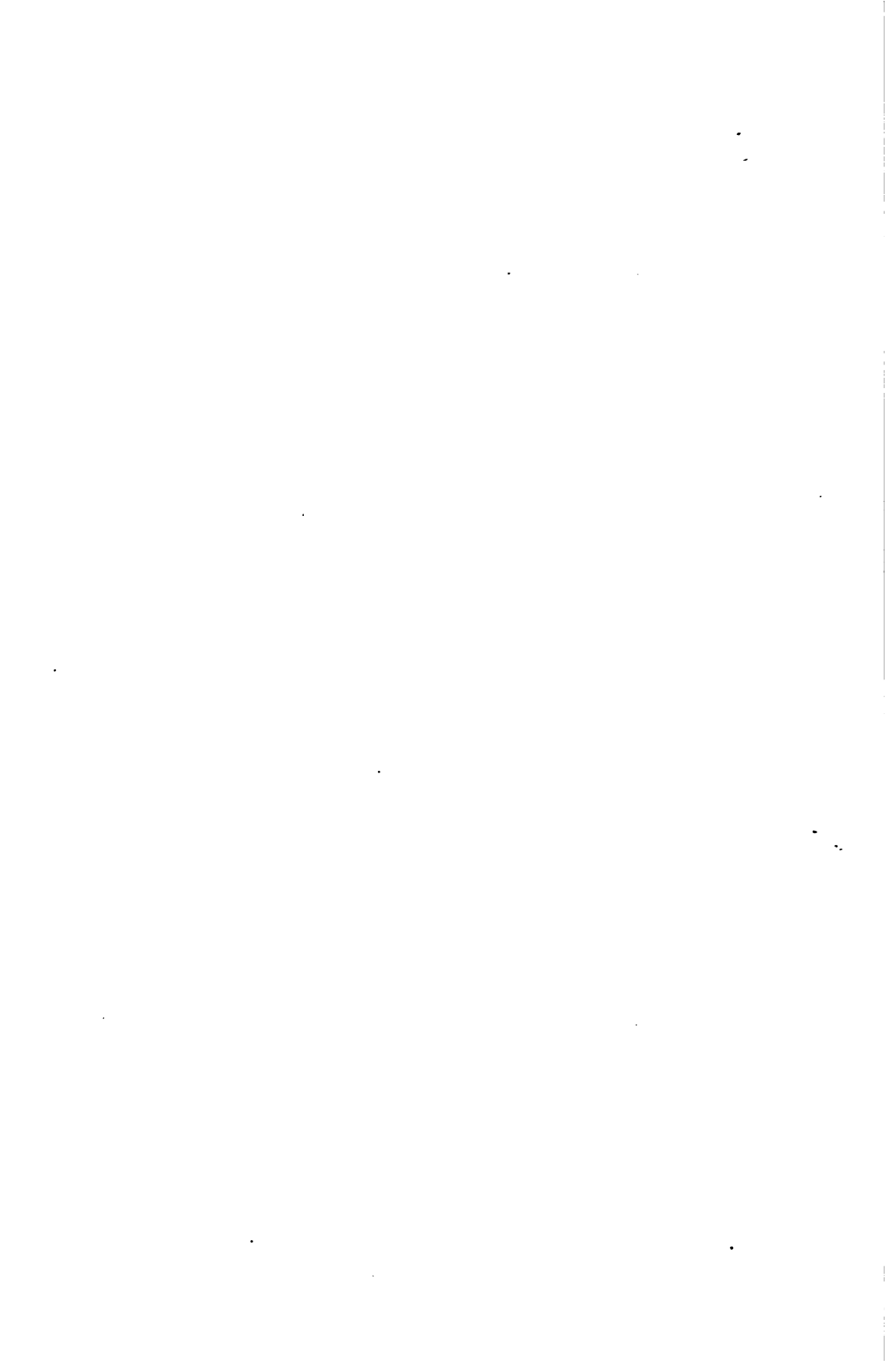
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The first of these Addresses was delivered at the opening of the one hundred and twelfth course of lectures in the Medical Department of the University of Pennsylvania. As extensive and radical changes had been made in the plan of medical teaching in that school, it seemed proper that a full statement should be given of the reasons for such reforms. An attempt was made, therefore, to present fairly the then position of medical teaching in America, to point out its chief defects and to indicate the causes that had led to them, and the evils to which they in turn gave rise. The second Address was delivered sixteen years later, in October, 1893, at the opening of the Four Years' Course of Medical Study. It is hoped it may serve to indicate the advances effected in the interval, and also the lines along which further progress should be made. In order to enable the accuracy of the statements in these Addresses to be tested, as well as to afford information which may be of value to those specially interested in this subject, brief synopses of the state of medical education in various countries in 1877 and 1893 have been prepared. These are given in three Appendices.

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